PALESTRICA OF THE THIRD MILLENNIUM
CIVILIZATION AND SPORT

PALESTRICA MILENIULUI III
CIVILIZAŢIE ŞI SPORT

A quarterly of multidisciplinary study and research

A journal rated B+ by CNCSIS in the period 2007-2011 and
certified by CMR since 2003

A journal with a multidisciplinary approach in the fields of biomedical science, health, physical exercise, social sciences applied to physical education and sports activities

A journal indexed in international databases:
EBSCO, Academic Search Complete, USA and
Index Copernicus, Journals Master List, Poland

4

Vol. 13, No. 4, October-December 2012

Palestrica of the third millennium – Civilization and sport
Palestrica Mileniului III – Civilizație și Sport
Vol. 13, no. 4, October-December 2012

Editorial Board
Comitetul editorial

Editorial Office of the Journal of
„Palestrica of the Third Millennium”
Civilization and Sport
Street: Clinicilor no. 1
400006, Cluj-Napoca
Telephone: 0264-598575
E-mail: palestrica@gmail.ro

pISSN 1582-1943
eISSN 2247-7322
ISSN-L 1582-1943
www.pm3.ro

Editors for English Language
Sally Wood-Lamont
Denisa Marineanu

Computer publishing
Anne-Marie Constantin

Website maintenance
Transmondo

Contents

Cuprins

Palestrica Mileniului III – Civilizaţie şi Sport
Vol. 13, no. 4, Octombrie-Decembrie 2012, 299–300

EDITORIAL

Consideraţii asupra tehnicii de bază în sport
Considerations on basic techniques in sports

Traian Bocu
Universitatea de Medicină şi Farmacie "Iuliu Haţieganu" Cluj-Napoca
Redactor şef al revistei Palestrica Mileniului III
Vicepreşedintele Societăţii Medicale Române de Educaţie Fizică şi Sport
traian_bocu@yahoo.com

Una dintre cele mai importante componente ale antrenamentului sportiv este pregătirea tehnică. Însuşirea tehnicii unei discipline sportive, a unei probe sau a unui element, se produce prin repetarea de exerciţii cu caracter specific. Cu cât tehnica este însuşită mai de timpuriu, cu atât şansele de obţinere a performanţelor înalte sunt mai mari. În acelaşi timp, iniţierea timpurie în tehnica ramurilor sportive implică trei mari riscuri. Primul mare risc îl reprezintă *însuşirea unei tehnici greşite*, din cauza pregătirii fizice precare a practicanţilor. Al doilea risc se datorează *erorilor de selecţie*, fapt ce impietează asupra însuşirii unei tehnici corecte, iar al treilea risc constă în *abandonul sportiv* după o perioadă îndelungată de timp şi bani investiţi în procesul de pregătire, datorat orientării sportive eronate (orientarea prea timpurie către performanţă, în loc de orientarea către competenţă).

a) *Însuşirea unei tehnici greşite* are mai multe cauze, dintre care le menţionăm pe următoarele: *iniţierea în tehnica sporturilor prea de timpuriu*; *incompetenţa cadrului didactic sau a antrenorului*; *aplicarea unei metodologii (tehnologii) de învăţare nepotrivite sau greşite*. Prima cauză o constituie graba de a obţine rezultate în competiţii de anvergură. La aceasta contribuie şi sistemul de evaluare al cadrului didactic/antrenorului care ia în considerare numărul de medalii/locuri 1-3 obţinute de copii la campionate. Dacă se merge pe selecţia bazată pe creativitate şi pe pregătirea în climat creativ, competiţiile de înalt nivel la vârsta copilăriei ar trebui rărite. A doua cauză ar impune o reformă în ce priveşte reaşezarea cadrelor didactice de specialitate în gimnaziu, în sensul de a repartiza la nivelul acestui palier pe cei mai buni specialişti în tehnica ramurilor sportive, foşti practicanţi ai unor sporturi, în care aceştia ar urma să facă iniţierea copiilor. Cadrele didactice care predau în şcoli primele elemente de tehnică prevăzute în programa şcolară trebuie să fie de cea mai bună calitate. Aceştia trebuie să fie buni cunoscători ai sporturilor în care ei se angajează să facă iniţierea. În primii ani de şcoală se învaţă primele exerciţii pentru formarea abilităţolor, necesare formării deprinderilor. Aceste exerciţii pregătitoare vor trebui însuşite foarte corect de către copii, pentru ca trecerea la învăţarea exerciţiilor fundamentale, apropiate de tehnica disciplinelor sportive să fie la fel de corectă. Pe măsura avansării în vârstă se vor introduce structuri de exerciţii bazate pe execuţii parţiale de tehnică, iar mai apoi execuţii globale. Acestea se vor baza pe principalele priceperi acumulate şi care însumate formează tehnica de bază, care pe fondul particularităţilor personale, formează stilul. Dacă tehnica de bază conţine erori, stilul se va forma pe baza acestora şi va cuprinde de asemenea erori, care vor fi greu corectabile. A treia cauză se referă la metodologia de învăţare a tehnicii, greşit aplicată de către cadrul didactic şi care duce la însuşirea tehnicii cu greşeli sau cu lacune, care cu greu mai pot fi corectate ulterior. Obligatoriu trebuie respectată metodologia învăţării tehnicii, algoritmul, succesiunea exerciţiilor, similar altor domenii de activitate unde există o tehnologie a învăţării. O mare parte din antrenamente se va consuma cu exerciţii specifice corectării acestor greşeli (Alexei, 2005; Alexei, 2006). Forţarea iniţierii în tehnica de bază nu este recomandabil să se producă înaintea dezvoltării la un nivel acceptabil al calităţilor motrice.

b) *Erorile de selecţie*. Una dintre erori o constituie aplicarea selecţiei prea de timpuriu. Predicţia este dificil de făcut la o vârstă timpurie, pierderile pe parcurs fiind mari. O altă eroare constă în aplicarea selecţiei de către nespecialişti. Selecţia trebuie să se bazeze pe specialişti şi efectuată după criterii ştiinţifice. Se acceptă totuşi ca în situaţii speciale să fie acceptată şi combinarea selecţiei ştiinţifice cu experienţa specialiştilor, deci selecţia empirică, pragmatică. Alte erori provin din aplicarea parţială a criteriilor de selecţie. De obicei este neglijată componenta psihologică a selecţiei. Selecţia se desfăşoară preponderent în şcoli, în cadrul orelor de educaţie fizică. Selecţia de succes se bazează pe trei condiţii, despre care am mai amintit cu alte ocazii: tratarea diferenţiată a elevilor la orele de educaţie fizică; punerea subiecţilor selecţionaţi în condiţii optime de mediu; aplicarea unor criterii ştiinţifice de selecţie (Salade, citat de Epuran, 1979; Bocu, 2010).

Un criteriu de selecţie foarte important, dar puţin exploatat, cu influenţă directă asupra însuşirii tehnicii,

este *rolul/impactul tipului temperamental* al indivizilor selecţionaţi, în vederea iniţierii lor ulterioare în tehnica unei discipline sportive. Se cunosc cele 4 tipuri temperamentale clasice (coleric, sangvinic, flegmatic, melancolic); se cunoaşte de asemenea faptul că nu există temperament în stare pură, ci numai o preponderenţă a unui temperament sau altul. *Temperamentul* constituie dimensiunea energetico-dinamică a personalităţii. În activitatea de selecţie trebuie inclusă şi încercarea de a surprinde unele caracteristici temperamentale, pornind de la faptul prezentat în literatura de specialitate, anume că pentru activitatea sportivă de performanţă, tipul temperamental cel mai indicat este sangvinicul generat de tipul de sistem nervos puternic echilibrat mobil (Demeter şi Epuran, 1979). Principalele caracteristici psihopedagogice ale tipurilor temperamentale, importanţa cunoaşterii acestora pentru activitatea sportivă, în special însuşirea tehnicii, precum şi încercările de identificare a celor mai convenabile tipuri pentru obţinerea succesului sportiv sunt următoarele:

- Indivizii identificaţi ca având un sistem nervos puternic neechilibrat, corespunzător temperamentului coleric, îşi însuşesc inegal tehnica disciplinelor sportive, învaţă rapid, dar şi uită repede, sunt foarte activi, uneori prea combativi, atitudine care nu poate fi întrutotul autocontrolată, motiv pentru care controlul acestei atitudini trebuie dirijat de antrenor către starea de calm şi autodirijare. Această muncă educativă necesită un efort suplimentar din partea cadrului didactic-antrenor.

- Indivizii care aparţin preponderent sistemului nervos puternic echilibrat, mobil, generator al temperamentului sangvinic, îşi însuşesc rapid, statornic şi creator tehnica disciplinelor sportive sau alte acţiuni motrice, în condiţiile unor antrenamente variate, pline de fantezie, foarte compatibile cu realitatea antrenamentului şi concursului; ca urmare a acestor particularităţi, temperamentul sanguinic întruneşte cele mai multe calităţi necesare obţinerii marii performanţe, prin formarea unui stil propriu de interpretare a tehnicii de bază, în funcţie de aptitudinile proprii.

- Indivizii care se încadrează în sistemul echilibrat inert, generator al temperamentului flegmatic, îşi însuşesc lent, dar sigur şi stabil tehnica disciplinelor sportive, se angajează constant şi tenace în efort, indiferent de dificultăţile acţiunii motrice, dând dovadă de mare rezistenţă la repetări; sunt înclinaţi spre rutină, refuzând schimbările; ca urmare este îngreunată formarea unor deprinderi noi, iar corectarea deprinderilor greşite se face cu mare dificultate, presupunând eforturi suplimentare.

- Indivizii care aparţin sistemului nervos slab, generator al temperamentului melancolic, îşi însuşesc greu tehnica unor discipline sau probe sportive, care au la bază în primul rând îndemânarea ca principală calitate motrică; pentru formarea unor deprinderi motrice, indivizii aparţinători acestui tip temperamental au nevoie de un număr foarte mare de execuţii cu pauze lungi şi repetate, iar din cauza capacităţii de efort şi a rezistenţei scăzute sunt necesare antrenamente prelungite în timp, fapt ce afectează procesul instructiv-formativ.

Din caracterizarea de mai sus se desprinde concluzia că în procesul de instruire-formare ulterior selecţiei, randamentul cel mai mare este obţinut de indivizii cu temperament preponderent sangvinic. Aceasta nu înseamnă că indivizii cu altă configuraţie temperamentală nu ar fi potriviţi pentru practicarea sportului de performanţă, ci numai faptul că pentru obţinerea succesului sportiv de către aceştia este necesar un volum diferenţiat mai mare de muncă destinat învăţării, din cauza asimilării mai greoaie (melancolicul), al corectării unor greşeli (flegmaticul) sau o muncă educativă suplimentară în vederea formării unor deprinderi necesare autocontrolului (colericul) (Bocu, 1997).

c) *Orientarea sportivă eronată*. Greşeala constă în orientarea motivaţiei chiar de la început către performanţă, (capacitate), mereu spre obţinerea locului I, deci a victoriei. S-a constatat că antrenorii preferă sportivul care câştigă, care se poate angaja să obţină un succes imediat (cel cu o orientare motivaţională către performanţă). Datorită acestei orientări greşite se înregistrează cele mai ridicate procente de abandon, de renunţare la activitatea sportivă. În etapa iniţială a procesului instructiv, motivaţia trebuie orientată către *competenţă*, urmărindu-se mai degrabă progresul făcut de participanţii la competiţie, corectitudinea execuţiilor tehnice şi autocontrolul (Krüger, 1993). Este necesar ca antrenamentele din această etapă să se desfăşoare într-un climat creativ, care trebuie creat de către cadrul didactic/antrenor. Climatul creativ se caracterizează prin diminuarea şi menţinerea stresului la un nivel adecvat prin crearea unui nivel motivaţional optim, bazat pe motivaţia intrinsecă de a practica sportul respectiv. Într-un climat creativ, sistemul competiţional este redus la minimum, iar dacă se organizează competiţii, acestea au un caracter „de casă", fapt ce stimulează motivaţia către competenţă.

Bibliografie

Alexei, M. Metodica învăţării probelor atletice. Ed. Napoca Star. Cluj-Napoca, 2005

Alexei M. Monografia probelor de sprint şi garduri. Ed. Napoca Star. Cluj-Napoca, 2006, 100-140

Bocu T. Premizele unei selecţii de succes în sport. Palestrica Mileniului III – Civilizaţie şi Sport. 2010; 11(2):99-100

Bocu T. Selecţia în sport. Ed. Dacia. Cluj-Napoca, 1997, 68-70

Demeter A. Criterii neuromusculare şi neuropsihice pentru selecţie. În Drăgan I. (coord). Selecţia medico-biologică în sport. Ed. Sport-Turism. Bucureşti, 1979, 43-48

Epuran M. Criterii neuromusculare şi neuropsihice pentru selecţie. Aspectul psihologic al selecţiei. În Drăgan I. (coord). Selecţia medico-biologică în sport. Ed. Sport-Turism. Bucureşti, 1979, 48-49

Krüger A. Posibilităţi şi riscuri în antrenament la copii şi juniori. În Sportul la copii şi juniori nr. 103 (2). Ed. CCPS. Bucureşti, 1996.

Palestrica of the third millennium – Civilization and Sport
Vol. 13, no. 4, October-December 2012, 301–305

ORIGINAL STUDIES
ARTICOLE ORIGINALE

Determinants of arterial stiffness in physically active middle aged adults

Determinanţi ai rigidităţii arteriale la adulţii de vârstă medie activi fizic

Amine Elloumi, Daniel Leucuţa, Mohamed Mohamed, Adriana Albu
"Iuliu Haţieganu" University of Medicine and Pharmacy, Cluj-Napoca

Abstract

Background. Increased arterial stiffness is considered an important predictor of cardiovascular events. It correlates with different classical cardiovascular risk factors and it may represent a cumulative measure of the impact of cardiovascular risk factors on the arterial wall. The influence of cardiovascular risk factors on arterial stiffness is not clearly established.

Aims. The aim was to evaluate the association of aortic pulse wave velocity (aPWV) and augmentation index (AIx) as parameters of arterial stiffness and cardiovascular risk factors in a group of physically active middle aged subjects.

Methods. This cross-sectional study included 59 subjects (25 males and 34 females) with normal arterial pressure and without manifest cardiovascular disease, aged 44.55 (±11.64) years. Parameters of arterial stiffness aPWV and AIx were measured using an oscillometric device.

Results. Aortic PWV positively correlated with age (r=0.65, p<0.001), fasting plasma glucose (r=0.31, p=0.02), systolic blood pressure (r=0.05, p=0.02), diastolic blood pressure (r=0.34, p=0.002), mean blood pressure (r=0.39, p=0.002) and heart rate (r=0.32, p=0.01). Brachial AIx directly correlated with age (r=0.42, p=0.01). After adjusting for age, in multiple regression analysis, the independent predictors for aPWV were fasting plasma glucose (r^2=0.32, p=0.03) and heart rate (r^2=0.33, p=0.04) and for AIx, abdominal circumference (r^2=0.22, p=0.03) and heart rate (r^2=0.22, p=0.02).

Conclusion. This study showed that fasting plasma glucose, abdominal circumference and heart rate are independent predictors of arterial stiffness. An early therapeutic intervention to optimize these parameters may reduce arterial stiffness and cardiovascular risk.

Keywords: cardiovascular risk factors, aortic pulse wave velocity, brachial augmentation index.

Rezumat

Premize. Creşterea rigidităţii arteriale este un important predictor al evenimentelor cardiovasculare. A fost corelată cu diferiţi factori de risc cardiovascular şi poate fi o consecinţă a acţiunii cumulative a acestora la nivelul peretelui vascular. Influenţa factorilor de risc asupra rigidităţii vasculare nu este clar cunoscută.

Obiective. Scopul studiului a fost de a evalua asocierea vitezei undei de puls aortice (aPWV) şi a indexului de augmentare brahial cu factorii clasici de risc cardiovascular la un grup de subiecţi de vârstă medie, fizic activi.

Metode. Acest studiu transversal a inclus 59 de subiecţi (25 de bărbaţi şi 34 de femei), cu vârsta medie de 44,55 (±11,64) ani. Parametrii rigidităţii arteriale (aPWV şi Aix) au fost determinaţi folosind un aparat oscilometric.

Rezultate. Viteza undei de puls aortice s-a corelat pozitiv cu vârsta (r=0,65, p<0,001), glicemia (r=0,31, p=0,02), presiunea arterială sistolică (r=0,05, p=0,02), presiunea arterială diastolică (r=0,34, p=0,002), presiunea arterială medie (r=0,39, p=0,002) şi frecvenţa cardiacă (r=0,32, p=0,01). Indexul de augmentare brahial s-a corelat direct cu vârsta (r=0,42, p=0,01). După controlarea vârstei, în regresie multiplă, glicemia (r^2=0,32, p=0,03) şi frecvenţa cardiacă (r^2=0,33, p=0,04) au fost predictori independenţi ai aPWV, iar pentru AIx, circumferinţa abdominală (r^2=0,22, p=0,03) şi frecvenţa cardiacă (r^2=0,22, p=0,02).

Concluzii. Acest studiu a arătat că glicemia, circumferinţa abdominală şi frecvenţa cardiacă sunt predictori independenţi ai rigidităţii arteriale. Intervenţia terapeutică precoce pentru optimizarea acestor parametri ar putea reduce rigiditatea arterială şi riscul cardiovascular.

Cuvinte cheie: factori de risc cardiovascular, viteza undei de puls aortic, indexul brachial de augmentare.

Received: 2012, July 29; *Accepted for publication:* 2012, September 8
Address for correspondence: 2nd Internal Medical Clinic, Clinicilor Str. no. 2-4, Cluj-Napoca
E-mail: albumed2@gmail.com

Introduction

Cardiovascular disease is the leading cause of morbidity and mortality in industrialized countries. The risk for developing atherosclerosis is only partly explained by the contribution of well known classical cardiovascular risk factors. Over the past decade accumulating data have supported the independent value of arterial stiffness as a predictor of future cardiovascular events, in different populations (Laurent et al., 2007). Aortic pulse wave velocity (aPWV) is considered the "gold standard" method for the measurement of arterial stiffness. The determination of aPWV is a simple and non-invasive method that has shown its relevance in predicting cardiovascular events, in many epidemiological studies (Laurent et al., 2007). Arterial stiffness has also an important clinical relevance. Stiffening causes the incident and reflected waves to travel faster, leading to the early return of the reflected wave to the heart. This increases left ventricle afterload that predisposes to left ventricular hypertrophy and left ventricular dysfunction. Arterial stiffness reduces diastolic blood pressure with an alteration in coronary perfusion that causes myocardial ischemia (O'Rourke, 2008; Adji & O'Rourke, 2011). Increased pulsatile pressure may produce damage in the microcirculation of the brain and kidneys and predispose to cerebral lacunar infarction and albuminuria (Franklin et al., 1997; Lee & Oh, 2012).

Age and blood pressure are very important determinants of arterial stiffening. The relation of other traditional risk factors with arterial stiffness seems to be less clear (Ceceljia & Chowienczyk, 2009; Wilkinson et al., 2011). The aim of this study was to evaluate the relationship of arterial stiffness with classical cardiovascular risk factors in middle aged adults without known cardiovascular diseases.

Hypothesis

We considered that in active middle aged subjects, without arterial hypertension, arterial stiffness may be influenced by other classical risk factors than age and blood pressure.

Material and methods

We included in this prospective cross-sectional study 59 patients (25 males and 34 females) who were evaluated in the 2nd Internal Medicine Department from Cluj-Napoca for functional digestive diseases, between September 2011 and April 2012. The exclusion criteria were: arterial hypertension or treatment with antihypertensive drugs, known cardiovascular disease, arrhythmia, diabetes mellitus, pulmonary or renal diseases, infection, and cancer. All patients signed the informed consent and the study was approved by the ethical committee of our institution.

A complete clinical examination was performed in all patients and the presence of a family history of cardiovascular diseases was noted. The body mass index (BMI) was calculated as the ratio between weight in kilograms and the square of height (Kg/m²). Abdominal circumference was measured at the midpoint between the lowest rib and the top of the iliac crest. The parameters of glucose, fasting plasma glucose (FGP) and lipid metabolism, total cholesterol and triglycerides, were measured in all patients. Hypercholesterolemia was defined as a plasma total cholesterol level > 200 mg/dl. Subjects were defined depending on their smoking habits as being current smokers or non-smokers.

Vascular examination

Vascular parameters were measured using an oscillometric device, Arteriograph (TensioMed, Budapest, Hungary). All measurements were done under standardized conditions (Laurent et al., 2007). The Arteriograph initially measures systolic blood pressure (SBP), diastolic blood pressure (DBP), mean blood pressure (MBP) and brachial pulse pressure (PP) in the upper arm. Then the device produces a cuff pressure that exceeds by 35 mmHg the SBP measured. Pulse pressure waves detected at this susprasystolic pressure are detected by the cuff and then sent to a computer. The software of Arteriograph analyzes the pressure waves resulting from the superposition of the descending forward wave and the reflected wave. The forward wave caused by the left ventricular systolic contraction travels forward and reflects at the aortic bifurcation, returning to the heart as a reflected wave. The distance traveled by the wave is equal to the length of the descending aorta. The length of the aorta is represented approximately by the distance between the jugular fossa and the symphysis. The travel time is the reflection time at 35 mmHg suprasystolic pressure (RT 35). PWV is calculated automatically as the ratio between the jugular fossa and the symphysis and RT 35. The augmentation index was calculated as follows: AIx=(P2-P1)/PP(%), where P2-P1 is the peak pressure difference between the early systolic pressure wave and the late systolic pressure wave and PP is the pulse pressure (Magometschnigg, 2005, Baulmann et al., 2008).

Statistical analysis

Data were expressed as means and standard deviation (mean±SD) for continuous variables and as percentage for categorical data. The mean values between two groups were compared using Mann Whitney U test and numerical correlations were established using linear correlation analysis. The independent association between the variables was examined using multiple regression analysis. $P<0.05$ was considered statistically significant. All statistical evaluations were performed using the SPSS 13.0 statistics software.

Results

The clinical characteristics of the study group are noted in Table I. There were 33.9% active smokers and no ex-smokers in this study, and 12 patients (20.3%) with hypercholesterolemia. All patients declared to be physically active.

Data are means ± standard deviations.

In linear correlation analysis, aPWV positively correlated with increasing age, fasting plasma glucose blood pressure (systolic, diastolic and mean values) and heart rate (Table II). Brachial AXi correlated with age (Table III).

Table I
Characteristics of the study population.

Parameter	Study group N=59
Age (years)	44.55±11.64
Male gender	25 (42%)
Family history of cardiovascular diseases	33(55.9%)
Smokers, n (%)	20(33.9%)
Body mass index (Kg/m²)	26±9.81
Abdominal circumference (cm)	91.2±57
Fasting plasma glucose (mg%)	101.77±45.90
Total cholesterol (mg%)	176.87±55.51
Triglycerides (mg%)	112.27±70
Systolic blood pressure (mmHg)	124.48 ± 12.37
Diastolic blood pressure (mmHg)	76.27±9.78
Pulse pressure (mmHg)	48.75±9.81
Mean blood pressure (mmHg)	92.19±12.2
Aortic pulse wave velocity (m/s)	8.51 ±2.02
Brachial augmentation index (%)	-20.98±29.75
Heart rate (beats/min)	68.7±4.2
Hypercholesterolemia n, (%)	12 (20.3%)

Table II
Relationship between aPWV and classical cardiovascular risk factors.

Aortic pulse wave velocity (m/s)	r	p
Age (years)	r= 0.65	<0.001
Male gender	-	p=0.83
Family history of cardiovascular diseases, n (%)	-	p=0.85
Smokers, n (%)	-	p=0.54
Body mass index (Kg/m²)	r=0.19	p=0.15
Abdominal circumference (cm)	r=0.13	p=0.33
Fasting plasma glucose (mg%)	r=0.31	p=0.02
Total cholesterol (mg%)	r=0.17	p=0.21
Triglycerides (mg%)	r=0.09	p=0.50
Systolic blood pressure (mmHg)	r=0.29	p=0.02
Diastolic blood pressure (mmHg)	r=0.34	p=0.002
Mean blood pressure (mmHg)	r=0.39	p=0.002
Pulse pressure (mmHg)	r=-0.009	p=0.94
Heart rate (beats/min)	r=0.32	p=0.01
Hypercholesterolemia	-	0.31

Table III
Relationship between brachial AXi and classical cardiovascular risk factors.

Brachial augmentation index (%)	r	p
Age (years)	0.42	0.001
Male gender	-	0.09
Family history of cardiovascular diseases, n (%)	-	0.27
Smokers, n (%)	-	0.49
Body mass index (Kg/m²)	-0.04	0.79
Abdominal circumference (cm)	-0.13	0.34
Fasting plasma glucose (mg%)	0.17	0.19
Total cholesterol (mg%)	0.008	0.95
Triglycerides (mg%)	-0.07	0.61
Systolic blood pressure (mmHg)	0.002	0.98
Diastolic blood pressure (mmHg)	0.15	0.24
Mean blood pressure (mmHg)	0.09	0.50
Pulse pressure (mmHg)	-0.11	0.41
Heart rate (beats/min)	-0.17	0.19
Hypercholesterolemia (%)	-	0.41

We performed multiple linear regression adjusted for age to determine the independent predictors of aPWV and brachial Aix, taking into account only the modifiable risk factors. Independent variables that entered the models were modifiable cardiovascular risk factors: smoking status, male gender, abdominal circumference, BMI, FPG, total cholesterol, triglycerides, diabetes, systolic blood pressure, diastolic blood pressure, pulse pressure, mean blood pressure and heart rate. The variables that are independently associated with parameters of arterial stiffness are listed in table IV.

Discussion

This study assessed the relationship between arterial stiffness (as measured by aortic PWV and brachial AIx) and classical cardiovascular risk factors in patients without hypertension or manifest cardiovascular disease. Aortic PWV is the speed of wave travel and intrinsically reflects arterial stiffness. Brachial AIx is an indirect marker of arterial stiffness, being more influenced by endothelial function and peripheral vascular tone. In this study, both markers of arterial stiffness showed a strong correlation with age. For aPWV, a positive correlation was also found with FPG, heart rate, systolic, diastolic and mean blood pressure. Brachial AIx correlated with age. The other cardiovascular risk factors that were taken into consideration did not independently correlate with parameters of arterial stiffness.

The influence of age on arterial stiffness was shown in previous studies (Laurent et al., 2007). The main structural modification with age is medial degeneration which leads to progressive stiffening of large elastic arteries. The mechanical effect of arterial pulsation in large arteries causes structural changes in elastin fibers and increases collagen content in the arterial wall (Lee & Oh, 2010; Lakatta & Levy, 2003). Collagen cross-links due to non-enzymatic glycation increase with age and contribute to age related arterial stiffness (Lakatta & Levy, 2003; Kass et al., 2001). Arterial hypertension, another important factor associated with stiffened arteries, augments mechanical vascular stress that leads to alterations in the extracellular matrix of the media and adventitia (Safar & London, 2000).

A recent systematic review of cross-sectional published literature reporting independent associations of carotid-femoral (aortic) PWV in multivariate regression models found that age and blood pressure were consistently independently associated with increased aPWV. This review also pointed out the fact that the majority of the studies found no independent association between aPWV and sex, total cholesterol, low density lipoprotein cholesterol, high-density lipoprotein cholesterol, triglycerides, smoking, or body mass index (Cecelja & Chowienczyk, 2009).

After adjusting for age in our study, FPG and heart rate were the only independent predictors of aPWV. The independent predictors for brachial AIx were abdominal

Table IV
Multiple linear regression analysis showing the determinants of aortic PWV and brachial AIx after adjustment for age.

Parameter	Coefficient	SE	T value	r²	p
Aortic pulse wave velocity (m/s)					
Fasting plasma glucose (mg%)	0.02	0.007	2.2	0.32	0.03
Heart rate (beats/min)	0.04	0.02	1.96	0.33	0.04
Brachial augmentation index (%)					
Abdominal circumference (cm)	-0.61	0.28	-2.18	0.22	0.03
Heart rate (beats/min)	-0.79	0.34	-2.3	0.22	0.02

Abbreviations: SE=standard error

circumference and heart rate.

Regarding the relationship between FPG and arterial stiffness, in a recent study FPG was positively and independently associated with brachial-ankle PWV in non-diabetic healthy adults, after correcting for confounding variables (Shin et al., 2011). Our results support the same linear, independent relationship between FPG and arterial stiffness in non-diabetic adults and that arterial stiffness may already be occurring in persons with FPG within normal ranges. Compared with this previous study, we measured aPWV and not ankle–brachial PWV. Aortic PWV is considered a more precise measure of central arterial stiffness and it is more closely related to cardiovascular outcomes than is ankle-brachial PWV (Laurent et al., 2007; Sugawara et al., 2005).

There are some other studies that link arterial stiffness with increasing levels of FPG. Lukish et al found a positive correlation between FPG, HbA1c and arterial stiffness in a study that included 284 Caucasian subjects (Lukich et al., 2010). Another study suggests the association of arterial stiffness with increasing levels of FGP in normoglycemic to diabetic subjects (Ohnish et al., 2003). At the same time, some studies have shown that increased FPG, even in normal ranges, is a risk factor for cardiovascular diseases (Bjornholt et al., 1999, Gerstein et al., 1999). We can speculate that increased arterial stiffness in these patients may be one of the factors underlying the increase in their cardiovascular risk.

Heart rate, an independent risk factor associated with both aPWV and AIx in our study, was previously independently associated with markers of arterial stiffness. Aortic PWV correlated with heart rate after adjustment for age and blood pressure in normal subjects in different studies (Lantelme et al. 2002; Johansen et al., 2012). Nevertheless, a recent large study reported that PWV was significantly dependent on heart rate, but after further adjustment for sex, quadratic age, and MBP, the influence of heart rate remained very small (***, 2010). Brachial AIx is much more sensitive to the effects of heart rate than aPWV (Lantelme et al. 2002; Albaladejo et al., 2001; Wilkinson et al., 2002). A plausible explanation for the relationship between arterial stiffness and heart rate may be the fact that the rate of elastin fracture depends on the number of stress cycles, that is, the number of heartbeats (Greenwald, 2007). Heart rate in large population groups was shown to be an independent marker of cardiovascular risk (Palatini & Julius, 1997) and we may suppose here a possible implication of increased arterial stiffness.

In our study, abdominal circumference was an independent predictor of AIx and not of aPWV. In a recent prospective study that evaluated risk factors for aortic stiffness in men, waist circumference was independently associated with both these markers of arterial stiffness (Carmel et al., 2010). Other previous studies reported the independent association of abdominal obesity particularly with aPWV (Recio-Rodriguez et al., 2012; Scuteri et al., 2012).

In our study, factors linked to aPWV were partly different from those linked to AIx, supporting the idea that they cannot be used interchangeably as indexes of arterial stiffness, providing different and complementary information (Laurent et al., 2007; Carmel et al., 2010).

One important limitation of our study is the small number of patients, which does not allow us to generalize our results. Another limitation is related to the cross-sectional design of the study, further longitudinal follow-up studies being necessary to confirm a cause-effect relationship between cardiovascular risk factors and the markers of arterial stiffness. Regarding the correlations of FPG with arterial stiffness, we did not evaluate different levels of FPG to assess the influence of high plasma levels on these parameters.

Conclusions

1. Our results suggest that after an adjustment for age, in middle aged physically active adults, without hypertension and overt cardiovascular diseases, FPG and heart rate are independent predictors for aPWV.

2. Heart rate and abdominal circumference are independently correlated with brachial AIx. As FPG, heart rate and abdominal circumference are modifiable risk factors, an early therapeutic intervention to optimize these parameters may reduce arterial stiffness and, as a consequence, the risk for cardiovascular disease.

Conflicts of interests

There are no conflicts of interests.

Authors' contributions: A. Elloumi had the greatest contribution in patient selection, examination and preparation of the manuscript, D. Leucuta performed statistical analyses, M. Mohamed participated in the selection of references and preparation of the manuscript and A. Albu suggested the design of the study and revised the manuscript for important scientific content.

References

Adji A, O'Rourke MF, Namasyvayam M. Arterial stiffness, its assessment, prognostic value and clinical implications for treatment. Am J Hypertens, 2011; 24(1):5-17.

Albaladejo P, Copie X, Boutouyrie P, et al. Heart rate, arterial stiffness, and wave reflections in paced patients. Hypertension, 2001; 38:949-952.

Baulmann J, Schillings U, Rickert S, et al. A new oscillometric method for assessment of arterial stiffness: comparison with tonometric and piezo-electric methods. J Hypertens, 2008; 26:523-528.

Bjornholt JV, Erikssen G, Aaser E, et al. Fasting blood glucose: an underestimated risk factor for cardiovascular death. Results from a 22-year follow-up of healthy nondiabetic men. Diabetes Care, 1999; 22:45-49.

Carmel M. McEniery, Michael Spratt, Margaret Munnery, et al. An Analysis of Prospective Risk Factors for Aortic Stiffness in Men 20-Year Follow-Up From the Caerphilly Prospective Study. Hypertension, 2010; 56:36-43.

Cecelja M, Chowienczyk P. Dissociation of aortic pulse wave velocity with risk factors for cardiovascular disease other than hypertension. Hypertension, 2009; 54:1328-1336.

Ceceljia M, Chowienczyk P. Dissociation of aortic pulse wave velocity with risk factors for cardiovascular disease other than hypertensive: a systematic review. Hypertension, 2009; 54:1328-1336.

Franklin SS, Gustin W 4th, Wong ND, et al. hemodynamic patterns of age-related changes in blood pressure:the Framingham Heart Study. Circulation, 1997; 96:308-315.

Gerstein HC, Pais P, Pogue J, Yusuf S. Relationship of glucose and insulin levels to the risk of myocardial infarction: a case-control study. J Am Coll Cardiol, 1999; 33:612-619.

Greenwald SE. Ageing of the conduit arteries. J Pathol, 2007; 211:157-172.

Johansen NB, Vistisen D, Brunner EJ, et al. Determinants of aortic stiffness: 16-year follow-up of the Whitehall II study. PLoS One 2012;7(5):e37165. Epub 2012 May 22.

Kass DA, Shapiro EP, Kawaguchi M, et al. Improved arterial compliance by a novel advanced glycation end-product crosslink broker. Circulation, 2001; 104:1464-1470.

Lakatta EG, Levy D. Arterial and cardiac aging: major shareholders in cardiovascular disease enterprises. Part I: Aging arteries: A "set up"for vascular disease. Circulation, 2003; 107:139-146.

Lantelme P, Mestre C, Lievre M, et al. Heart rate: an important confounder of pulse wave velocity assessment. Hypertension, 2002;39(6):1083-1087

Laurent S, Cockroft JR, Van Bortel LM, et al. Abridged version of the expert consensus document on arterial stiffness. Artery Res, 2007; 1:2-12.

Lee HY, Oh BH. Aging and arterial stiffness. Circ J, 2010; 74:2257-2262.

Lee H-Y, Oh B-H. Aging and arterial stiffness. Circ J, 2012; 74:2257-2262.

Lukich E, Matas Z, Boaz M, Shargorodsky M. Increasing derangement of glucose homeostasis is associated with increased arterial stiffness in patients with diabetes, impaired fasting glucose and normal controls. Diabetes Metab Res Rev, 2010; 26:365-370.

Magometschnigg D. Blood pressure and arterial stiffness. A comparison of two devices for measuring augmentation index and pulse wave velocity. Wien Med Wochenschr, 2005; 155:404-410.

O'Rourke MF. How stiffening of the aorta and elastic arteries leads to compromised coronary flow. Heart, 2008; 94:690-691.

Ohnish H, Isobe T, Saitoh S, et al. Pulse wave velocity as an indicator of atherosclerosis in impaired fasting glucose. Diabetes Care, 2003; 26:437-440.

Palatini P, Julius S. Heart rate and the cardiovascular risk. J Hypertens, 1997; 15:3-17.

Recio-Rodriguez JI, Gomez-Marcos MA, Patino-Alonso MC, et al. Abdominal obesity vs general obesity for identifying arterial stiffness, subclinical atherosclerosis and wave reflection in healthy, diabetics and hypertensive. BMC Cardiovasc Disord, 2012; 12:3

http://www.biomedcentral.com/1471-2261/12/3

Safar ME, London GM. Therapeutic studies and arterial stiffness in hypertension: recommendation of the European Society of Hypertension, 2000; 18:1527-1535.

Scuteri A, Orru' M, Morrell CH, Tarasov K, et al. Associations of large artery structure and function with adiposity: effects of age, gender, and hypertension. The SardiNIA Study. Atherosclerosis, 2012; 221(1):189-197.

Shin JY, Lee HR, Lee DC. Increased arterial stiffness in healthy subjects with high-normal glucose levels and in subjects with pre-diabetes. Cardiovasc Diabetol, 2011; 10:30.

http://www.cardiab.com/content/10/1/30

Sugawara J, Hayashi K, Yokoi T, et al. Brachial-ankle pulse wave velocity: an index of central arterial stiffness? J Hum Hypertension, 2005; 19:401-406.

Wilkinson IB, McEniery CM, Cockroft JR. Arteriosclerosis and atherosclerosis. Guilty by association. Hypertension, 2011; 54:1213-1215.

Wilkinson IB, Mohamad NH, Tyrrel S, et al. Heart rate dependency of pulse pressure amplification and arterial stiffness. Am J Hypertens, 2002; 15:24-30.

***. The Reference Values for Arterial Stiffness' Collaboration. Determinants of pulse wave velocity in healthy people and in the presence of cardiovascular risk factors: 'establishing normal and reference values'. Eur Heart J, 2010; 31:2338-2350.

Palestrica of the third millennium – Civilization and Sport
Vol. 13, no. 4, October-December 2012, 306–315

Improvement of algo-dysfunctional syndrome by postural therapy in lumbosacral spine diseases

Ameliorarea sindromului algo-disfuncţional prin terapie posturală în patologia lombo-sacrată

Dana-Maria Dimulescu, Gheorghe Chiriţi
"Carol Davila" University of Medicine and Pharmacy Bucharest,
National Institute of Rehabilitation, Physical Medicine and Balneoclimatology

Abstract

Background. Patients with lumbosacral pathology are one of the most common groups that are consulted in rehabilitation services, on account of the algo-dysfunctional syndromes caused by these diseases.

Aims. Achievement of a prospective, randomized study regarding the efficiency of the physical-kinetics recovery program with the emphasis on postural therapy in two groups of patients with lumbo-sacral spine diseases (radiculopathies, low back pain, sequelae after lumbar disk herniation surgery, lumbar canal stenosis); utilization of a clinical-functional assessment following the evidence-based research model.

Methods. The groups (1-experimental, 2-control) each comprised 60 patients of both sexes and different ages, with lumbo-sacral spine diseases. The differentiation between the two groups was achieved using a methodology of recovery whereby therapy-group 1 received postural therapy as part of the physical-kinetics program. The following clinico-functional parameters were assessed: pain, physical dysfunctions (fingertip-to-floor-test, lumbosacral spine static disorders, muscle strength, Lassegue, osteotendinous reflexes), disabilities (ADL, movement ability, absenteeism, work ability-return to activity).

Results. Pain improved by 67.40% (group 1) vs. 56.53 (group 2); cumulated physical dysfunctions improved by 42.49% (group 1) vs. 32.67% (group 2). Cumulated disabilities score recorded improvements of 69.40% (group 1) vs. 59.14% (group 2).

Conclusions. The results of this study show a higher efficiency for the recovery process that includes an optimized postural therapy methodology for patients with lumbosacral spine diseases (radiculopathies, low back pain, sequelae after lumbar disk herniation surgery, lumbar canal stenosis) in the improvement of pain, physical dysfunction and disability scores.

Keywords: lumbosacral spine diseases, postural therapy, algo-dysfunctional syndrome, disabilities.

Rezumat

Premize. Pacienţii cu patologie lombo-sacrată constituie una din cele mai frecvente cauze de adresabilitate în serviciile de recuperare, prin sindroamele algo-disfuncţionale cauzate de aceste afecţiuni.

Obiective. Efectuarea unui studiu prospectiv, randomizat, privind eficienţa programului de recuperare fizical-kinetică, cu accent pe terapia posturală, la 2 loturi de pacienţi cu patologie a coloanei lombo-sacrate (radiculopatii, LBP, sechele HDL-LDH operată, stenoză de canal lombar); utilizarea unei evaluări clinico-funcţionale, după modelul cercetărilor bazate pe dovezi.

Metodă. Loturile (1-experimental şi 2-martor) au inclus câte 60 pacienţi de ambe genuri, din diferite grupe de vârstă, cu afecţiuni ale coloanei lombo-sacrate. Diferenţierea între cele 2 loturi s-a realizat prin metodologia de tratament recuperator - la lotul 1 punând accent pe metodologia de tratament postural în cadrul programului fizical-kinetic. Parametrii clinico-funcţionali evaluaţi au fost: durerea, disfuncţiile fizice (IDS-FFT, modificările de statică ale coloanei lombare, forţa musculară, Lassegue, ROT-OTR), dizabilităţile (ADL, capacitatea de deplasare, absenteismul şi capacitatea de muncă - revenirea în activitate).

Rezultate. Durerea s-a ameliorat cu 67,40% la lotul 1, comparativ cu 56,53% la lotul 2. Disfuncţiile fizice cumulate au obţinut ameliorări de 42,49% la lotul 1, comparativ cu 32,67% la lotul 2. Scorul dizabilităţilor cumulate s-a ameliorat cu 69,40% la lotul 1, comparativ cu 59,14% la lotul 2.

Concluzii. Rezultatele studiului indică o eficienţă semnificativ mai mare a programului de recuperare, ce include o metodologie de terapie posturală optimizată, la pacienţii cu patologie lombo-sacrată (radiculopatii, LBP, sechele HDL-LDH operată, stenoză de canal lombar) în ameliorarea scorurilor durerii, disfuncţiilor fizice şi dizabilităţilor.

Cuvinte cheie: patologie lombo-sacrată, terapie posturală, disfuncţii fizice, dizabilităţi.

List of abbreviations: ADL - Activity of daily living, FFT (IDS) - Fingertip-to-floor-test, LBP - Low back pain, LDH (HDL) - Lumbar disk herniation, OTR (ROT) - Osteotendinous reflexes, VAS - Visual Analogue Scale, EMG - Electromyography, GPR - Global Postural Reeducation, SE - Stabilization exercises, AINS (NSAID) - Non-steroidal anti-inflammatory drugs, AIS (SAID) - Steroidal anti-inflammatory drugs, SNV (ANS) - Autonomic Nervous System

Received: 2012, July 17; *Accepted for publication:* 2012, September 10
Address for correspondence: "Carol Davila" University of General Medicine and Pharmacy, Bucharest, Eroilor Sanitari Av. no.8a
E-mail: dm.dimulescu@gmail.com

Introduction

Approximately 70 to 85% of individuals can suffer an episode of low back pain during their lifetime and over 80% of them will suffer recurring episodes.

The methodology for rehabilitation focused on posture alignment therapy, applied in diseases of the lumbosacral spine together with modern pharmacological therapy, contributes to the improvement of the pain dysfunction syndrome, to the lowering of the costs necessary for in-hospital medical care as well as to an increase in the quality of the patient's life (Dimulescu & Chiriți, 2007).

Specialized literature studies report various percentages of improvement of LBP after one month of recovery treatment: 58% (Pengel et al., 2003), 73% (Granger, 2003). Other authors (Hurley & Mcdonough, 2004) do not show differences in the improvement of pain intensity in acute LBP patients, by combining the effect of manipulations with the use of medium frequency currents. Jellema & Bierma-Zeinstra (2002) highlighted the role of lumbar orthoses in 59 workers with LBP who used the device in 2 phases: during the first phase (first week) the workers wore the orthosis each work day; during the second phase (the next six weeks), the orthosis was worn during work days when workers complained of LBP; pain decreased from 10 to 7 (VAS scale), 61-81% of the workers wearing the lumbar orthosis while performing their tasks, the extensive use of the device at home not being specified.

Cacciatore & Horak (2005) studied the improvement of postural coordination through the use of conscious processes of altering automatic postural coordination and continuous muscle activity, achieving an improvement of pain intensity through the Alexander Technique; prior to using this technique, patients exhibited laterally asymmetric automatic postural responses to translations; after using this technique, the magnitude and asymmetry of the responses and balance improved and low back pain decreased.

Cacciatore et al. (2011) demonstrated that dynamic modulation of postural tone using the Alexander Technique reduces axial stiffness in patients with LBP. Jones et al. (2012) show that LBP patients subject to postural perturbations (on a balance platform) reduce these perturbations through a hyperactivity of trunk and ankle muscles.

Harrison et al. (2005) used a posture correction programme, through mirror images, which included trunk tilting exercises and traction opposite to the trunk tilt direction, thus obtaining a reduction of pain intensity. Li & Huang (2007) showed the superior effect of decompression and rehabilitation in the reduction of pain intensity in patients with spinal disc herniation, split into three groups: A - computerized pelvic tractions and therapeutic ultrasound; B - only pelvic tractions; C - pelvic tractions, therapeutic ultrasound and Chinese traditional medicine, the best results being achieved by group C ($p<0.05$); Rydeard & Leger (2006) highlighted the effect of conventional therapy and of specific training exercises (Pilates) performed for 4 weeks by patients with LBP, with an improvement of the pain score ($p=0.002$).

Bonetti et al. (2010) evaluated the efficiency of global postural reeducation – GPR, compared to stability exercise (SE) programmes in patients with chronic LBP, showing the superiority of global postural reeducation exercises in pain reduction. Dunk & Callaghan (2010) studied postural responses and pain scores in patient with chronic LBP during prolonged sitting; the posture of the spine was examined via a movement analysis pattern during two posture alignments. Patients with LBP showed a marked statistical reduction of pain ($p<0.0001$).

Kressig & Beauchet (2003) showed the role of "tai chi" in improving physical dysfunctions.

Objectives

We aimed to elaborate a study on the efficiency of the chosen individually adapted physical rehabilitation methods, focusing on posture alignment therapy, according to modern evidence-based physical medicine standards, by using evaluation scales and scores for clinical and functional data (pain, objective physical dysfunctions), as well as for disabilities including, besides ADL and movement ability, social, professional and economic criteria such as absenteeism and working inability determined by sickness.

Hypothesis

A growing number of studies show the advantages of the rehabilitation programme in lumbosacral pathology. Including posture alignment therapy in the recovery methodology may optimize the results obtained in the improvement of the studied clinical and functional parameters.

Material and methods

This study was conducted in the National Institute of Rehabilitation, Physical Medicine and Balneoclimatology in Bucharest. A set of assessment methods was used, based on scales and scores of: pain, physical dysfunctions, disabilities, comparing admission and discharge, in accordance with the assessment methodology used in modern evidence-based research.

Clinico-functional parameters evaluated in the studied groups were represented by:

a) *Pain*

As a defining basic parameter in this disease category, it was evaluated based on VAS (visual analogue scale: 0-10): intensity of dominant pain indicated by the patient during the test, by granting points (0-3): 0 – absence of pain, 1 point for 1-3 VAS values, 2 points for 4-7 VAS values, 3 points for 8-10 VAS values;

By the addition of the 5 values, we calculated a pain score which can be between 0 and 15 points.

b) *Physical dysfunctions*

They were appreciated based on the evaluation of 5 clinical examination parameters:

- mobility of the lumbar spine in flexion, evaluated by the fingertip-to-floor-test (FFT), with 0-3 points (0 – below 5 cm, 1 – between 6 and 10 cm, 2 – between 11 and 30 cm, 3 – over 30 cm);
- lumbosacral spine static disorders (scoliosis, disappearance of lumbar lordosis or hyperlordosis,

evaluated with 0 points-absent and 1point-present);

- muscle strength, evaluated by testing the muscles in the affected territory, the resulting values (0-5) being evaluated with 0-3 points: value 5 = 0 points, value 4/4 plus = 1 point, values 3/4 minus = 2 points, values below 3 = 3 points;

- Lasègue test, evaluated with 0-2 points (0 – negative, 1 – diminished between 45-90°, 2 – diminished below 45°);

- Achilles and patellar reflexes, evaluated together with 0-2 points (0-normal, 1-diminished or 2-absent at least one of them).

By the addition of the 5 evaluated parameters, we calculated for each patient the score of physical dysfunctions, which can amount to 0-11 points.

c) *Disabilities*

They were assessed by the evaluation of ADL, movement ability, absenteeism and return to activity after treatment:

- ADL was evaluated using a simplified scale (ADL 24); based on the obtained score, ADL dysfunctions were evaluated with: 0=normal (60 points); 1=mild dysfunctions (50-59 points); 2=moderate dysfunctions (35-49 points); 3=severe dysfunctions (< 35 points).

- Movement ability was evaluated with 0-4 points: 0=normal, 1=possible outside the house, with limits +/- walking assist devices, 2=possible only inside the house, with no restrictions, 3=possible inside the house with difficulty +/- walking assist devices; 4=bed or chair-ridden.

- Absenteeism caused by LBP was assessed on admission for the last 30 days, and on discharge based on the medical leave granted subsequently, using a scale with 0-4 points: 0=no leave, 1=medical leave of 1-3 days, 2=medical leave of 4-7 days, 3=medical leave of 2-3 weeks, 4=medical leave of 1 month.

- Work ability (return to professional activity) was appreciated in active patients, using a scale of 0-2 points: 0=return to activity, 1=needs medical leave, 2=medically retired.

Absenteeism and return to activity were included in disabilities only for active patients; disabilities that can reach 13 points in professionally active patients (Dimulescu & Chiriţi, 2008).

Groups

Each of the 2 groups (group 1- experimental group and group 2 - control group) included 60 patients of both genders from different age categories, with disorders from the LBP group, similar in structure.

Table I

Structure of groups according to gender and age.

Groups/Age (years)		20-30	31-40	41-50	51-60	61-70	Total
Group 1	Female	10	11	5	4	2	32
	Male	9	10	3	3	3	28
Total		19	21	8	7	5	60
Group 2	Female	10	10	5	4	2	31
	Male	10	10	2	4	3	29
Total		20	20	7	8	5	60

Table II

Structure of groups according to gender and mean age.

Groups/Gender	No. of cases	Mean age	Minimum age	Maximum age
Group 1	60 (100%)	41.74	20	69
Male	28 (46.7%)	42.07	21	67
Female	32 (53.3%)	41.46	20	69
Group 2	60 (100%)	41.57	20	70
Male	29 (48.3%)	41.65	20	66
Female	31 (51.7%)	41.51	20	70

Table III shows the distribution of the groups by gender and diagnosis.

Given these characteristics of distribution by age and gender, mean age and diagnosis in the 2 groups, it may be that they satisfy the conditions of a randomized trial, allowing for the comparison of results.

Treatment and rehabilitation methodology used in the 2 study groups

In this prospective study, the distinction between the two treatment groups is made by the methodology that was applied to the patients.

In group 2, considered the control group, patients were treated by using the usual Rehabilitation Clinic methodology, which includes for all patients with LBP and sciatic radiculopathy:

- low and medium frequency electrotherapy (diadynamic, stereofrem), ultrasound: antalgic, decontracturant effects;

- therapeutic massage - antalgic, decontracturant effects;

- kinesitherapy - exercises to increase the mobility of the lumbosacral spine (based on Williams or McKenzie technique) according to the clinical form of the disease and symptoms, exercises to increase muscular strength (isometric, isotonic) for abdominal muscles, stabilizers of the hip, neutral posture of the spine, muscle rehabilitation in paretic radiculopathies (Lucescu, 2009);

- pharmacological therapy: NSAIDs, SAIDs, analgesics, decontracturants.

In group 1 (experimental group), the methodology was applied selectively, giving a particular role to postural

Table III

Structure of groups according to gender and diagnosis.

Groups/Diagnosis		Radiculopathies	LBP	Sequelae after lumbar disk herniation surgery	Lumbar canal stenosis	Total
Group 1	Female	9	12	6	5	32
	Male	8	11	5	4	28
Total		17 (28.3 %)	23 (38.3%)	11 (18.3%)	9 (15%)	60 (100.0%)
Group 2	Female	9	11	6	5	31
	Male	9	11	5	4	29
Total		18 (30%)	22 (36.6)	11 (18.3%)	9 (15%)	60 (100.0%)

therapy, depending on the clinical form (radiculopathies, sequelae after lumbar disk herniation surgery, musculoligamentous LBP, lumbar canal stenosis), and evolution stage (acute, subacute or chronic).

The complex physical-kinetic treatment included:

- rest in antalgic positions;
- adopting postures aimed at increasing vagal tone and rebalancing the vegetative nervous system (Mendez & Gomez-Conesa, 2001; Lucescu, 2009);
- wearing a spinal orthosis - this is done whenever it is needed to limit spinal motion, correct positions, reduce mechanical stress on the lower lumbar segment of the spine (Anderson & Redford, 2000);
- relaxation exercises, indicated especially for patients with paravertebral muscular contractures (patient involvement is aimed for the purpose of contracted muscle awareness, of achieving muscle relaxation and preventing constant muscle tension - "hold-relax" exercises, using Kabat diagonals for legs to influence trunk muscles);
- exercises to increase the mobility of the lumbosacral spine (based on Williams or McKenzie technique) according to the clinical form of the disease and symptoms;
- exercises to increase muscular strength (isometric, isotonic) for abdominal muscles, stabilizers of the hip, neutral posture of the spine (lumbar extensor muscles, relaxation of spinal muscles and psoas-iliac muscle, toning of abdominals and gluteal muscles) (Lucescu, 2009);
- exercises to develop control and coordination (including proprioceptive facilitation techniques, tactile sensitivity, passive mobilization, stretching, visual or acoustic feedback, EMG bio-feedback); rehabilitation exercises for muscles in the affected territory (in the case of paretic radiculopathies).

Statistical analysis

Based on literature data regarding the objective evaluation of the evolution of spine diseases such as LBP and lumbar radiculopathies – on Oswestry, Roland-Morris, Waddel, Dallas or Quebec scales – this prospective study attempted to monitor the assessment of a number of significant parameters of these diseases, which allowed for the calculation of global indicators of pain, physical dysfunctions and disabilities (apart from ADL, also including the ability to move and indicators with social and economic value such as absenteeism caused by disease and the patients' resumption of their professional activity after treatment); finally, the results were assessed by calculating the difference between the global score at admission and at discharge, expressed as percentage.

Ensuring the statistical significance of the obtained results was performed at first by coding them according to the evaluations and the quota previously mentioned, and finally through the analysis of their statistical significance by employing adequate tests (the Student's average comparison test, correlations between initial and final scores).

In order to compare the mean values of quantitative variables, the "t" test (Student's test) was used.

If the calculated test value was lower than the Tt critical value (extracted from the tables designed especially for "Student distribution"), the difference between the mean values was considered as statistically insignificant (SI), in this case the p-value (p-risk) > 0.05, and if the calculated test value was higher than the Tt critical value from the tables ($p<0.05$), the difference between the mean values was considered statistically significant. In this case, depending on p values, the following situations shall be considered:

- $0.01 < p < 0.05$ – statistically significant difference (S);
- $0.001 < p < 0.01$ – statistically very significant difference (VS)
- $p<0.001$ – statistically highly significant difference (HS)

An EPI INFO file ("database") with the recorded data of the investigated patients was created for future statistical processing, the charts were created in EXCEL and the paper was written in WORD format using WINDOWS XP as OS.

Results

a) *Pain*

A comparative assessment of the pain scores reveals an improvement of 67.40% in the experimental group (1), while in the control group (2), the improvement reached 56.53%. In patients with radiculopathies, pain improvement was 69.11% (group 1), compared to 58.63% (group 2); both groups had a higher improvement of pain than the group average. In patients with LBP, the improvement of the pain score was 80.62% in group 1 compared to 69.25% in group 2. In patients with sequelae after lumbar disk herniation surgery, the pain score improvement had lower values, 50.55% in group 1, 40.19% in group 2, respectively. In patients with lumbar canal stenosis, the improvement of the pain score had values of 53.45% in group 1, compared

Table IV

Evolution of mean pain scores according to diagnosis.

Groups	No. of cases	Mean scores		Score differences (admission-discharge)	Statistical significance (p-value)
		Admission	Discharge		
Group 1	60	7.21	2.35	4.86 (67.40%)	$p < 0.01$
Radiculopathies	17	9.52	2.94	6.58 (69.11%)	$p < 0.01$
LBP	23	6.04	1.17	4.87 (80.62%)	$p < 0.001$
Sequelae after lumbar disk herniation surgery	11	8.09	4.00	4.09 (50.55%)	$p < 0.05$
Lumbar canal stenosis	9	4.77	2.22	2.55 (53.45%)	$p < 0.05$
Group 2	60	7.34	3.19	4.15 (56.53%)	$p < 0.05$
Radiculopathies	18	9.38	3.88	5.50 (58.63%)	$p < 0.01$
LBP	22	6.18	1.90	4.28 (69.25%)	$p < 0.01$
Sequelae after lumbar disk herniation surgery	11	8.36	5,00	3.36 (40.19%)	$p < 0.05$
Lumbar canal stenosis	9	4.88	2.77	2.11 (43.23%)	$p < 0.05$

to 43.23% in group 2 (Dimulescu & Chiriti, 2008).

b) *Physical dysfunctions*

1. *FFT*

The recorded improvement percentage was 55.48% in group 1, compared to 43.11% in group 2.

2. *Lumbosacral spine static disorders*

The recorded improvement percentage was 69.23% in group 1, compared to 54.94% in group 2.

3. *Muscle strength*

The recorded improvement percentage was 30.99% in group 1, compared to 24.27% in group 2.

4. *Lassegue Score*

The recorded improvement percentage was 35.71% in group 1, compared to 23.28% in group 2.

5. *Osteotendinous reflexes*

There was no improvement in the osteotendinous reflex scores in the 2 groups, which remained unchanged.

Table V

Evolution of FFT score in groups I and II according to diagnosis.

Groups	No. of cases	Mean scores		Score differences (admission-discharge)	Statistical significance (p-value)
		Admission	Discharge		
Group 1	60	1.64	0.73	0.91 (55.48%)	p < 0.01
Radiculopathies	17	1.94	1.00	0.94 (48.45%)	p < 0.05
LBP	23	1.78	0.52	1.26 (70.78%)	p < 0.001
Sequelae after lumbar disk herniation surgery	11	1.45	0.90	0.55 (37.93%)	N.S.
Lumbar canal stenosis	9	1.00	0.55	0.45 (45.00%)	p < 0.05
Group 2	60	1.67	0.95	0.72 (43.11%)	p < 0.05
Radiculopathies	18	2.00	1.33	0.67 (33.50%)	N.S.
LBP	22	1.77	0.73	1.04 (58.75%)	p < 0.01
Sequelae after lumbar disk herniation surgery	11	1.54	1.09	0.45 (29.22%)	N.S.
Lumbar canal stenosis	9	0.89	0.56	0.33 (37.07%)	N.S.

Table VI

Evolution of spine static disorder score in groups I and II according to diagnosis.

Groups	No. of cases	Mean scores		Score differences (admission-discharge)	Statistical significance (p-value)
		Admission	Discharge		
Group 1	60	0.91	0.28	0.63 (69.23%)	p < 0.01
Radiculopathies	17	1.00	0.35	0.65 (65.00%)	p < 0.01
LBP	23	1.00	0.13	0.87 (87.00%)	p < 0.001
Sequelae after lumbar disk herniation surgery	11	0.82	0.45	0.37 (45.12%)	N.S.
Lumbar canal stenosis	9	0.66	0.33	0.33 (50.00%)	N.S.
Group 2	60	0.91	0.41	0.50 (54.94%)	p < 0.05
Radiculopathies	18	1.00	0.50	0.50 (50.00%)	p < 0.05
LBP	22	1.00	0.32	0.68 (68.00%)	p < 0.01
Sequelae after lumbar disk herniation surgery	11	0.72	0.45	0.27 (37.50%)	N.S.
Lumbar canal stenosis	9	0.77	0.44	0.33 (42.85%)	N.S.

Table VII

Evolution of muscle strength score in groups I and II according to diagnosis.

Groups	No. of cases	Mean scores		Score differences (admission-discharge)	Statistical significance (p-value)
		Admission	Discharge		
Group 1	60	1.71	1.18	0.53 (30.99%)	p < 0.05
Radiculopathies	17	1.82	1.23	0.59 (32.41%)	p < 0.05
LBP	23	1.43	0.86	0.57 (39.86%)	p < 0.01
Sequelae after lumbar disk herniation surgery	11	2.18	1.72	0.46 (21.10%)	N.S.
Lumbar canal stenosis	9	1.66	1.22	0.44 (26.50%)	p < 0.05
Group 2	60	1.73	1.31	0.42 (24.27%)	N.S.
Radiculopathies	18	1.83	1.38	0.45 (24.59%)	N.S.
LBP	22	1.45	1.00	0.45 (31.03%)	p < 0.05
Sequelae after lumbar disk herniation surgery	11	2.18	1.81	0.37 (16.97%)	N.S.
Lumbar canal stenosis	9	1.66	1.33	0.33 (19.87%)	N.S.

Table VIII

Evolution of Lassegue score in groups I and II according to diagnosis.

Groups	No. of cases	Mean scores		Score differences (admission-discharge)	Statistical significance (p-value)
		Admission	Discharge		
Group 1	60	0.70	0.45	0.25 (35.71%)	N.S.
Radiculopathies	17	1.52	0.88	0.64 (42.10%)	p < 0.05
LBP	23	0	0	0	-
Sequelae after lumbar disk herniation surgery	11	1.09	0.81	0.28 (25.68%)	N.S.
Lumbar canal stenosis	9	0.44	0.33	0.11 (25.00%)	N.S.
Group 2	60	0.73	0.56	0.17 (23.28%)	N.S.
Radiculopathies	18	1.50	1.11	0.39 (26.00%)	p < 0.05
LBP	22	0	0	0	-
Sequelae after lumbar disk herniation surgery	11	1.09	0.90	0.19 (17.43%)	N.S.
Lumbar canal stenosis	9	0.55	0.44	0.11 (20.00%)	N.S.

6. *Cumulated physical dysfunction score*

The physical dysfunction score improved by 42.49% in group 1 compared to 32.67% in group 2, after 2 weeks of hospitalization.

In patients with radiculopathies, the results reached 40.05% in group 1, compared to 28.51% in group 2, lower values than the group average. In patients with LBP, there was an improvement of 63.13% in group 1, compared to 51.42% in group 2; in patients with sequelae after lumbar disk herniation surgery, the improvement values were 25.03% in group 1, compared to 19.33% in group 2; in patients with lumbar canal stenosis, the physical dysfunction score had improvement values of 30.85% in group 1 and 24.88% in group 2 (Dimulescu & Chiriti, 2008).

c) *Disabilities*

1. *ADL Score*

The improvements recorded in the ADL score were 73.10% in group 1, compared to 63.55% in group 2.

2. *Movement ability*

The recorded improvements were 68.69% in group 1, compared to 58.97% in group 2.

3. *Absenteeism* determined by sickness was assessed only in active patients in the two groups, and accounted for 55 out of 60 patients in each of the 2 groups; all patients had medical leaves before hospitalization.

The results indicate significant reductions of absenteeism after treatment in both groups, by 70.85% in group 1, compared to 59.50% in group 2.

4. *Work ability – return to activity*

A return to activity percentage of 63.10% was found for patients in group 1, while for patients in group 2 the percentage was lower – 53.46%; most of the patients who returned to activity after treatment had a diagnosis of LBP, 80.00% in group 1, 69.04% in group 2, respectively.

5. *Cumulated disability score*

The improvements recorded in the disability score were 69.40% in group 1, compared to 59.14% in group 2. In patients with radiculopathies, the improvement percentage was 70.88% (group 1), compared to 60.39% (group 2). Patients with LBP had improvements of 83.37% in

Table IX

Evolution of physical dysfunction score in groups 1 and 2 according to diagnosis.

Groups	No. of cases	Mean scores		Score differences (admission-discharge)	Statistical significance (p-value)
		Admission	Discharge		
Group 1	60	5.46	3.14	2.32 (42.49%)	$p < 0.05$
Radiculopathies	17	7.04	4.22	2.82 (40.05%)	$p < 0.05$
LBP	23	4.21	1.51	2.70 (63.13%)	$p < 0.01$
Sequelae after lumbar disk herniation surgery	11	6.623	4.97	1.66 (25.03%)	N.S.
Lumbar canal stenosis	9	4.31	2.98	1.33 (30.85%)	N.S.
Group 2	60	5.54	3.73	1.81 (32.67%)	$p < 0.05$
Radiculopathies	18	7.05	5.04	2.01 (28.51%)	$p < 0.05$
LBP	22	4.22	2.05	2.17 (51.42%)	$p < 0.05$
Sequelae after lumbar disk herniation surgery	11	6.62	5.34	1.28 (19.33%)	N.S.
Lumbar canal stenosis	9	4.42	3.32	1.10 (24.88%)	N.S.

Table X

Evolution of ADL score in groups I and II according to diagnosis.

Groups	No. of cases	Mean scores		Score differences (admission-discharge)	Statistical significance (p-value)
		Admission	Discharge		
Group 1	60	1.19	0.32	0.87 (73.10%)	$p < 0.01$
Radiculopathies	17	1.70	0.41	1.29 (75.88%)	$p < 0.01$
LBP	23	0.95	0.13	0.82 (86.31%)	$p < 0.01$
Sequelae after lumbar disk herniation surgery	11	1.18	0.54	0.64 (54.23%)	N.S.
Lumbar canal stenosis	9	0.88	0.33	0.55 (62.50%)	$p < 0.05$
Group 2	60	1.18	0.43	0.75 (63.55%)	$p < 0.05$
Radiculopathies	18	1.72	0.61	1.11 (64.52%)	$p < 0.05$
LBP	22	0.90	0.22	0.68 (75.55%)	$p < 0.05$
Sequelae after lumbar disk herniation surgery	11	1.18	0.63	0.55 (46.61%)	N.S.
Lumbar canal stenosis	9	0.77	0.33	0.44 (57.14%)	N.S.

Table XI

Evolution of movement ability score in groups I and II according to diagnosis.

Groups	No. of cases	Mean scores		Score differences (admission-discharge)	Statistical significance (p-value)
		Admission	Discharge		
Group 1	60	1.15	0.36	0.79 (68.69%)	$p < 0.01$
Radiculopathies	17	1.70	0.52	1.18 (69.41%)	$p < 0.01$
LBP	23	0.91	0.17	0.74 (81.31%)	$p < 0.01$
Sequelae after lumbar disk herniation surgery	11	1.09	0.54	0.55 (50.45%)	N.S.
Lumbar canal stenosis	9	0.77	0.33	0.44 (57.14%)	N.S.
Group 2	60	1.17	0.48	0.69 (58,97%)	$p < 0.05$
Radiculopathies	18	1.66	0.66	1.00 (60.24%)	$p < 0.05$
LBP	22	0.90	0.27	0.63 (70.00%)	$p < 0.05$
Sequelae after lumbar disk herniation surgery	11	1.09	0.64	0.45 (41.28%)	N.S.
Lumbar canal stenosis	9	0.88	0.44	0.44 (50.00%)	N.S.

group 1, compared to 71.87% in group 2. In patients with sequelae after lumbar disk herniation surgery, the recorded improvement values were 54.36% in group 1, 45.18% in group 2, respectively. In patients with lumbar canal stenosis, the improvement values were 62.15% in group 1, compared to 53.10% in group 2.

Regarding the results obtained for the general disability score, the highest improvement percentages were recorded in patients with LBP, followed by those with radiculopathy, canal stenosis, sequelae after lumbar disk herniation surgery (Dimulescu & Chiriti, 2008).

Discussion

By comparing the initial values (at admission) and final values (at discharge, after two weeks of treatment) of the studied parameters, the efficiency of posture alignment therapy within the recovery treatment was observed in the experimental group.

Hurley & Mcdonough (2004) performed a prospective randomized study on the effects of manipulations combined with medium frequency (interferential) current therapy compared to the individual use of each procedure; no differences in pain reduction were noticed in patients with acute LBP. Dallolio (2005) used a pneumatic orthosis (Orthotrac) at lumbar level, which allows support for stability and decompression in 41 patients (23 males and 18 females aged 19-25) with radicular pain (disc protrusion, spondylolisthesis, foraminal stenosis, facet syndrome); the patients wore this orthosis for 60 minutes, three times a day, for five weeks; all patients showed a decrease or even the disappearance of radicular pain (the assessment was performed using the SF-36). Jellema & Bierma-Zeinstra (2002) highlighted the role of lumbar orthoses in 59 workers with LBP, who used the device in 2 phases: during the first phase (first week) the workers wore the orthosis each work day; during the second phase (the next six weeks), the orthosis was worn during work days when workers complained of LBP; pain decreased from 10 to 7 (VAS scale), 61-81% of the workers wearing the lumbar orthosis while performing their tasks, the extensive use of

Table XII

Evolution of absenteeism score in groups I and II according to diagnosis.

Groups	No. of cases	Mean scores		Score differences (admission-discharge)	Statistical significance (p-value)
		Admission	Discharge		
Group 1	55	1.99	0.58	1.41 (70.85%)	p < 0.05
Radiculopathies	17	2.23	0.65	1.53 (70.85%)	p < 0.05
LBP	20	1.60	0.25	1.35 (84.37%)	p < 0.01
Sequelae after lumbar disk herniation surgery	11	2.63	1.09	1.54 (58.55%)	p < 0.05
Lumbar canal stenosis	7	1.71	0.57	1.14 (66.67%)	p < 0.01
Group 2	55	2.00	0.81	1.19 (59.50%)	p < 0.05
Radiculopathies	18	2.16	0.88	1.28 (59.25%)	p < 0.05
LBP	19	1.52	0.42	1.10 (72.36%)	p < 0.01
Sequelae after lumbar disk herniation surgery	11	2.63	1.36	1.27 (48.28%)	p < 0.05
Lumbar canal stenosis	7	1.85	0.85	1.00 (54.05%)	p < 0.05

Table XIII

Evolution of work ability score in groups I and II according to diagnosis.

Groups	No. of cases	Mean scores		Score differences (admission-discharge)	Statistical significance (p-value)
		Admission	Discharge		
Group 1	55	1.03	0.38	0.65 (63.10%)	p < 0.05
Radiculopathies	17	1.00	0.35	0.65 (65.00%)	p < 0.05
LBP	20	0.75	0.15	0.60 (80.00%)	p < 0.01
Sequelae after lumbar disk herniation surgery	11	1.63	0.81	0.82 (50.30%)	p < 0.05
Lumbar canal stenosis	7	1.00	0.42	0.58 (58.00%)	p < 0.05
Group 2	55	1.01	0.47	0.54 (53.46%)	p < 0.05
Radiculopathies	18	1.00	0.44	0.56 (56.00%)	p < 0.05
LBP	19	0.84	0.26	0.58 (69.04%)	p < 0.01
Sequelae after lumbar disk herniation surgery	11	1.54	0.90	0.64 (41.55%)	p < 0.05
Lumbar canal stenosis	7	0.85	0.42	0.43 (50.58%)	p < 0.05

Table XIV

Evolution of mean disability score in groups 1 and 2 according to diagnosis.

Groups	No. of cases	Mean scores		Score differences (admission-discharge)	Statistical significance (p-value)
		Admission	Discharge		
Group 1	60	5.36	1.64	3.72 (69.40%)	p < 0.05
Radiculopathies	17	6.63	1.93	4.70 (70.88%)	p < 0.05
LBP	23	4.21	0.70	3.51 (83.37%)	p < 0.01
Sequelae after lumbar disk herniation surgery	11	6.53	2.98	3.55 (54.36%)	p < 0.05
Lumbar canal stenosis	9	4.36	1.65	2.71 (62.15%)	p < 0.05
Group 2	60	5.36	2.19	3.17 (59.14%)	p < 0.05
Radiculopathies	18	6.54	2.59	3.95 (60.39%)	p < 0.05
LBP	22	4.16	1.17	2.99 (71.87%)	p < 0.01
Sequelae after lumbar disk herniation surgery	11	6.44	3.53	2.91 (45.18%)	p < 0.05
Lumbar canal stenosis	9	4.35	2.04	2.31 (53.10%)	p < 0.05

the device at home not being specified. The advantages of the rigid corset compared to the simple corset: it limits movement to a greater extent; it allows better lumbar posture control; it limits lateral and rotational movements.

Advantages of the simple corset: it is easier to accept from an esthetic point of view; older patients accept this type of corset more easily; it ensures a better posture control if the patient is obese; it is lighter than the rigid corset; it decreases muscle tone through prolonged use to a lesser extent; it ensures better abdominal compression. The rigid corset limits spine mobility while the simple corset creates an abdominal connection which, apart from increasing intra-abdominal pressure which in turn leads to a reduction of the load of the spinal disc, also determines the flattening of the abdomen and the reduction of lumbar lordosis (Fisher & Winter, 2000).

Cacciatore & Horak (2005) studied the improvement of postural coordination through the use of conscious processes of altering automatic postural coordination and continuous muscle activity, achieving an improvement of pain intensity through the Alexander Technique; prior to using this technique, patients exhibited laterally asymmetric automatic postural responses to translations; after using this technique, the magnitude and asymmetry of the responses and balance improved and low back pain decreased.

Cacciatore et al. (2011) demonstrated that dynamic modulation of postural tone using the Alexander Technique reduces axial stiffness in patients with LBP. Jones et al. (2012) show that LBP patients subject to postural perturbations (on a balance platform) reduce these perturbations through a hyperactivity of trunk and ankle muscles.

Harrison et al. (2005) used a posture correction programme, through mirror images, which included trunk tilting exercises and traction opposite to the trunk tilt direction, thus obtaining a reduction of pain intensity. Li & Huang (2007) showed the superior effect of decompression and rehabilitation in the reduction of pain intensity in patients with spinal disc herniation, split into three groups: A - computerized pelvic tractions and therapeutic ultrasound; B - only pelvic tractions; C - pelvic tractions, therapeutic ultrasound and Chinese traditional medicine, the best results being achieved by group C ($p<0.05$); Rydeard & Leger (2006), highlighted the effect of conventional therapy and of specific training exercises (Pilates) performed for 4 weeks by patients with LBP, with an improvement of the pain score ($p=0.002$). Lang & Liebig (2003) showed the superiority of a multidisciplinary rehabilitation programme (2 hours of physical therapy, 1 hour of behavioral therapy, 30 minutes of progressive muscle relaxation, 30 minutes of physical education) applied three times a week, for 20 days, compared to the conventional physical therapy programme in improving the pain score for patients with LBP.

Bonetti et al. (2010) evaluated the efficiency of global postural reeducation – GPR, compared to stability exercise (SE) programmes in patients with chronic LBP, showing the superiority of global postural reeducation exercises in pain reduction. Dunk & Callaghan (2010) studied postural responses and pain scores in patients with chronic LBP during prolonged sitting; the posture of the spine was examined via a movement analysis pattern during two posture alignments. Patients with LBP showed a marked statistical reduction of pain ($p<0.0001$). Albaladejo et al. (2010) demonstrated the efficiency of a complex programme in reducing LBP consisting of: educational programme (15 minutes) – based on healthy nutrition, postural hygiene (15 minutes), physical therapy (1 hour) – based on stretching and other exercises that can be performed at home. This programme led to the improvement of the pain score and disabilities of these patients.

We found references concerning the results of some treatment programmes related to physical dysfunctions, usually by means of qualitative assessments: significant improvements of the radicular pain score after multimodal treatment for admitted patients (Frisch, 2003), improvement of functional parameters (Guven, 2003; Jousset, 2003) significant effects on muscle force, finger-ground index, Lassegue test (Sancho, 2003; Marshall & Murphy, 2006), but also by means of quantitative assessments such as the improvement of muscle force by 76.7% (Gimigliano, 2003). Ceran & Ozcan (2006) show that changes in the functional state are associated with pain, disability in patients with LBP. Badke & Boissonnault (2006) show the improvement of muscle strength and resistance in patients with LBP, as a result of a recovery programme which included: passive mobilizations, manipulations, exercises for increasing joint mobility, massage, thermotherapy, cryotherapy. Krismer & Van Tulder (2007) used a multidisciplinary programme including rest, resistance training, behavioral therapy, in order to reduce pain, dysfunctions and to prevent chronicity in patient with LBP. Kressig & Beauchet (2003) show the role of "tai chi" in the reduction of physical dysfunctions. Anema & Steenstra (2007) conducted a study in 196 active participants with LBP: 96 patients benefited from interventions concerning adaptation to the workplace, while 100 were subject to conventional therapy; the assessment was performed after 12, 26 and 52 weeks – the improvement of the functional status was more significant in the patients of the first group.

Some studies report reduction percentages concerning some indicators: reduction of absenteeism by 58% in a group of 30 patients with chronic LBP after a recovery programme (Roques, 2003) or mentions of qualitative assessments are made: maintaining physical capacity and professional activity (Verfaille et al., 2003), improved ADL and work capacity (Lauridsen et al., 2006).

Fischer (2004) assessed the quality of life of 82 patients operated for LDH and sciatica 6 months and 1 year after surgery. Neurological symptoms and pain and disability scores improved significantly after 6 months, but from that point up to one year after surgery, the changes were minor. Scheel & Hagen (2002) obtained an average number of days of medical leave for patients with LBP split into 3 groups: proactive (70 days of medical leave), passive (68 days) and the control group (71 days); the percentage of the patients who returned to work before 50 weeks was similar in the proactive group (89%), the passive group (89.5%) and the control group (89.1%). Lang & Liebig (2003), following a multidisciplinary rehabilitation programme (physical therapy, muscle relaxation, behavioral therapy, physical education), obtained a drop in absenteeism (16 ±35 days), superior to that of the conventional therapy

programme (-2±39 days). Goldby & Moore (2006) showed the effect of a recovery programme including passive mobilizations, manipulations (10 weeks) on the reduction of the disability score in patients with chronic LBP. Kaapa & Frantsi (2006) conducted a prospective study in 120 patients divided into 2 groups, depending on the recovery programme that they followed: multidisciplinary rehabilitation (training, workplace adaptation, the back school, relaxation techniques, behavioral therapy) amounting to 70 hours, and individual physical therapy (active physical exercises, passive therapy) amounting to 10 hours; the results in the improvement of the disability score were similar. Friedrich & Gittler (2005) conducted a prospective study in 92 patients with LBP, in which the control group received a standard treatment programme, the study group underwent a mixed programme consisting of exercises and a motivational programme; a significant improvement of the disability score was achieved by the study group. Faber & Burdorf (2006) showed the effect of specific training exercises – Pilates – in the significant reduction of the disability score (p=0.023), a reduction maintained for 12 months. Anema & Steenstra (2007) conducted a study in 196 active participants with LBP: 96 patients benefited from interventions concerning adaptation to the workplace, while 100 were subjected to conventional therapy; the assessment was performed after 12, 26 and 52 weeks – the time required to resume work was 77 days for the group with workplace adaptation (p=0.002) and 104 days for the group with conventional therapy (p=0.02).

Conclusions

The prospective study on the efficiency of the rehabilitation of patients with lumbosacral diseases shows a significant improvement of the studied clinical and functional parameters among patients of the experimental group (using adequate posture alignment therapy within the recovery programme), compared to the control group: the pain of the experimental group was reduced by 67.40% after treatment compared to 56.53% for the control group; physical dysfunctions were reduced by 42.49% in the experimental group compared to 32.67% in the control group; disabilities were reduced by 69.40 in the first group, compared to 59.14% in the second group. In both groups, the best results were obtained by patients with lumbar pain and muscle and ligament LBP, followed by radiculopathies, while modest results were obtained by patients with lumbar spinal stenosis and patients with sequelae after lumbar disk herniation surgery.

Conflicts of interests

There are no conflicts of interests.

Acknowledgement

The study is part of the doctoral thesis of the first author.

References

Albaladejo C, Kovacs FM, Royuela A, del Pino R, Zamora J. The efficacy of a short education program and a short physiotherapy program for treating low back pain in primary care: a cluster randomized trial. Spine, 2010; 35(5):483-496.

Anderson CW, Redford JB. Orthotic treatment for injuries and diseases of the spinal column. Phys. Med. Rehabil., 2000; 14:471-484.

Anema JR, Steenstra IA. Multidisciplinary rehabilitation for subacute low back pain: graded activity or work-place intervention or both? a randomized controlled trial. Spine, 2007; 32(3):291-298.

Badke MB, Boissonnault WG. Changes in disability following physical therapy intervention for patients with low back pain: dependence in symptom duration. Arch. Phys. Med. Rehabil., 2006; 87(6):749-756.

Bonetti F, Curti S, Mattioli S, Mugnai R, Vanti C, Violante FS, Pillastrini P. Effectiveness of a „Global Postural reeducation" program for persistent low back pain: a non-randomized controlled trial. BMC Musculoskelet. Disord. 2010; 11:285

Cacciatore TW, Gurfinkel VS, Horak FB, Cordo PJ, Ames KE. Increased dynamic regulation of postural tone through Alexander Technique training. Hum.Mov.Sci. 2011; 30(1):74-89.

Cacciatore TW, Horak FB. Improvement in automatic postural coordination following Alexander technique lessons in a person with low back pain. Phys.The. 2005; 85(6):565-578.

Ceran F, Ozcan A. The relationship of the Functional Rating Index with disability, pain and quality of life in patients with low back pain. Med.Sci.Monit.m 2006; 12(10):CR435-439.

Dallolio V. Lumbar spinal decompression with a pneumatic orthesis (Orthotrac): preliminary study. Acta. Neurochir. Suppl., 2005; 92:133-137.

Dimulescu DM, Chiriţi G. Posturarea. Principii şi tehnici de posturare. Rev. de Recuperare, Medicină Fizică şi Balneologie. 2007; 3-4:122-123

Dimulescu DM, Chiriţi G. Terapia posturală în afecţiunile aparatului locomotor. Ed. Universităţii din Bucureşti. 2008; 132-134.

Dunk NM, Callaghan JP. Lumbar spine movement patterns during prolonged sitting differentiate low back pain developers from matched asymptomatic controls. Work, 2010; 35(1):3-14.

Faber E, Burdorf A. Determinants for improvement in different back pain measures and their influence on the duration of sickness absence. Spine, 2006; 31(13):1477-1483.

Fisher C. Outcome evaluation of the operative management of lumbar disc herniation causing sciatica. Neurol Med Chir (Tokio), 2004; 44(3):118-122.

Fisher SV, Winter RB. Spinal orthoses in rehabilitation. In Braddom R. Phys. Med. and Rehabil. 2-nd Ed. Philadelphia, WB Saunders, 2000; 353-369.

Friedrich M, Gittler G. Long-term effect of a combined exercise and motivational program on the level of disability of patients with chronic low back pain. Spine, 2005; 30(9):995-1000.

Frisch SA, Widder B. Radicular LBP: Evaluation of Conservative Multimodal Treatment. Occup Environ Med. 2003; 60(10):715-721.

Gimigliano. Physical therapy in lumbar spinal stenosis. 2 nd. World Congr. of ISPRM, Prague, May, Abstracts 2003; 44.

Goldby LJ, Moore AP. A randomized controlled trial investigating the efficiency of musculoskeletal physiotherapy of chronic low back disorder. Spine, 2006; 31(10):1083-1093.

Granger C. An analysis of the rate per day of pain improvement and factors affecting improvement in outpatients with LBP. 2nd World Congr. of ISPRM, Prague, May Abstracts, 2003; 3.

Guven S. Effectiveness of lumbo-pelvic stabilization exercise education on chronic mechanical LBP. 2nd World Congr. of ISPRM, Prague, May, Abstracts, 2003;180.

Harrison DE, Cailliet R, Betz JW. A non-randomized clinical control trial of Harrison mirror image methods for correcting trunk list (lateral translations of the thoracic cage) in patients with chronic low back pain. Eur. Spine, 2005; 14(2):155-162.

Hurley DA, Mcdonough SM. A randomized clinical trial of

manipulative therapy and interferential therapy for acute low back pain. Spine, 2004; 29(20):2207-2216.

Jellema P, Bierma-Zeinstra SM. Feasibility of lumbar supports for home care workers with low back pain. Occup. Med. 2002; 52(6):317-323.

Jones SL, Henry SM, Raasch CC, Hibs JR, Bunn JJ. Individuals with non-specific low back pain use a trunk stiffening strategy to maintain upright posture. J.Electromyogr.Kinesiol. 2012; 22(1):13-20.

Jousset N. Functional restauration versus active individual therapy in LBP controlled, randomised trial. 2nd World Congr. of ISPRM, Prague, May Abstracts, 2003; 24.

Kaapa EH, Frantsi K. Multidisciplinary group rehabilitation versus individual physiotherapy for chronic nonspecific low back pain: a randomized trial. Spine, 2006; 31(4):371-376.

Kressig RW, Beauchet O. Tai chi in the elderly: practical aspects. Rev. Med. Suisse. Romande, 2003; 123(11):671-675.

Krismer M, Van Tulder M. Low back pain. Best Pract. Res. Clin. Rheumatol. 2007; 21(1):77-91.

Lang E, Liebig K. Multidisciplinary rehabilitation versus usual care for chronic low back pain in the community: effects on quality of life. Spine, 2003; 3(4):270-276.

Lauridsen HH, Hartvigsen J, Manniche C, Korsholm L, Grunnet-Nilsson N. Responsiveness and minimal clinically important difference for pain and disability instruments in low back pain patients. BMC. Musculoskelet. Disord. 2006; 7:82-84

Li XY, Huang ZM. Therapeutic effect of compositive rehabilitation on lumber disc herniaton. Zhong. Nan. Da. Xue, 2007; 32(1):144-147.

Lucescu V. Afecţiunile degenerative ale coloanei vertebrale-Clinica, diagnosticul şi tratamentul de recuperare. Ed. Dobrogea, 2009; 148-153, 206-210

Marshall P, Murphy B. Changes in the flexion relaxation response following an exercise intervention. Spine, 2006; 31(23):E 877-883

Mendez FJ, Gomez-Conesa A. Postural hygiene program to prevent low back pain. Spine, 2001; 26(11):1280-1286.

Pengel LH, Herbert RD, Maher CG, Refshange KM. Acute low back pain: systematic review of its prognosis. Am.J.Orthop., 2003; 32(8):392-394.

Roques C. Chronic LBP patients quality of life, clinical correlations. 2nd World Congr. of ISPRM, Prague, May Abstracts, 2003; 38.

Rydeard R, Leger A. Pilates-based therapeutic exercise: effect on subjects with nonspecific low back pain and functional disability: a randomized controlled trial. J. Orthop. Sports. Phys. Ther. 2006; 36 (7):472-484.

Sancho S. Functional restauration in LBP-patients: outcome at two-year follow-up. 2nd World Congr. of ISPRM, Prague, May, Abstracts, 2003; 185.

Scheel IB, Hagen KB. Blind faith ? The effects of promoting active sick leave for back pain patients: a cluster-randomized controlled trial. Spine, 2002; 27(23):2734-2740.

Verfaille S, Delarue Y, Demangeon S, Beuret-Blanquart F. Evaluation after four years of exercise therapy for chronic low back pain. Ann.readapt.Med.Phys. 2005; 48(2):53-60

Palestrica of the third millennium – Civilization and Sport
Vol. 13, no. 4, October-December 2012, 316–320

Prediction of coordination performance in ice-hockey players based on the structure of coordination capacities
Predicţia indicilor de coordonare la jucătorii de hochei pe gheaţă în baza structurii capacităţilor coordinative

Jaroslav Broďáni, Jaromír Šimonek
Department of Physical Education & Sport, "Constantine the Philosopher" University, Nitra, Slovakia

Abstract

Background. In ontogenesis, ice-hockey lays specific requirements on the level of coordination capacities. The development of coordination capacities differs from the one of conditional capacities, while individual peculiarities of sportsmen should not be omitted.

Aims. An important role is played by the hierarchy of coordination prerequisites in the structure of sport performance. Several remarks are made concerning the issues of the structure of coordination capacities.

Methods. Possibilities of prediction of coordination performance in ice-hockey in 11-15-year-old players were analysed. The research was carried out on a set of selected 283 pupils (11-year-olds=63, 12-year-olds=57, 13-year-olds=56, 14-year-olds=57, 15-year-olds=50) from sport classes within the Slovak Republic specializing in ice-hockey. Coordination performance was observed using 7 motor criteria by Hirtz. Individual performances in coordination tests were transformed into points based on the 5-grade coordination standard for ice-hockey and figured in one test value, which presents an overall level of coordination performance (predictant "Y").

Dependence and share of individual coordination criteria to the overall coordination performance were disclosed using the technique of multiple correlation and regression analysis. The selection of three most valid coordination (predictors "$X_{(T1-T7)}$") criteria into prediction equations of coordination performance was performed using forward stepwise regression.

Results. The most significant coordination capacities in hockey in ontogenesis are: rhythmic capacity, spatial orientation and temporal parameters estimation. The structure of the above mentioned capacities is invariable in boys aged 11 and 12 years. At the age of 13, the share of spatial orientation capacity is transferred to complex motor reaction speed. At the age of 14 to 15, the stability of rhythmic and spatial orientation capacities is proved true. The share of significance of temporal parameter estimation at the age of 14 is transferred to dynamic balance and at the age of 15, to kinesthetic-differentiation capacity of legs. In players aged 11 to 15 years, we are able to predict the overall coordination performance based on the three selected criteria with a rather high reliability (62.64-72.77%) and low error (1.523-1.973).

Conclusions. The designed calculations can facilitate talent identification, as well as the reduction of specific tests of coordination capacities.

Keywords: ice-hockey, coordination capacities, sport performance, structure, prediction, regression analysis, correlation analysis, boys.

Rezumat

Premize. În ontogeneză, hocheiul pe gheaţă presupune anumite cerinţe la nivelul capacităţilor de coordonare. Dezvoltarea capacităţilor de coordonare diferă de cea a capacităţilor condiţionale, fără a neglija însă particularităţile individuale ale sportivilor.

Obiective. În structura performanţei sportive un rol imporant îl are ierarhia premizelor de coordonare. Intenţia noastră a fost să menţionăm câteva observaţii privind problematica structurii capacităţilor de coordonare.

Metode. Au fost analizate posibilităţile de predicţie a indicilor de coordonare în hocheiul pe gheaţă la băieţi de 11-15 ani. Cercetarea s-a desfăşurat pe un lot de 283 de elevi (11 ani – 63, 12 ani – 57, 13 ani – 56, 14 ani – 57, 15 ani – 50) selectat din clase de sport din Republica Slovacă, specializate în practicarea hocheiului pe gheaţă. Indicii de coordonare au fost observaţi utilizând 7 criterii motrice după Hirtz. Performanţele individuale la testele de coordonare au fost transformate în puncte, pe baza standardului de coordonare cu 5 grade pentru hocheiul pe gheaţă şi s-a elaborat o valoare de test care prezintă un nivel general al indicelui de coordonare (predictivul „Y").

Dependenţa şi ponderea criteriilor de coordonare individuală cu indicii generali de coordonare au fost identificate folosind tehnici de corelare multiplă şi de analiza regresiei. Selectarea celor mai valide trei criterii de coordonare (predictorii „$X_{(T1-T7)}$") în ecuaţii de predicţie a indicilor de coordonare s-a efectuat utilizând regresia pas cu pas.

Rezultate. În ontogeneză capacităţile coordinative cele mai semnificative în hochei sunt: ritmul, orientarea în spaţiu şi estimarea parametrilor temporali. Structura capacităţilor menţionate mai sus este invariabilă la băieţii de 11 şi 12 ani. La vârsta de

Received: 2012, March 8; *Accepted for publication:* 2012, June 4
Address for correspondence: Department of Physical Education & Sport, Constantine the Philosopher University, Nitra, Slovakia
E-mail: jsimonek@ukf.sk; jbrodani@ukf.sk

13 ani, capacitatea de orientare în spaţiu este transferată vitezei de reacţie. La vârsta de 14 până la 15 ani se dovedeşte adevărată stabilitatea capacităţilor ritmice şi de orientare în spaţiu. Parte semnificativă a estimării parametrilor temporali la vârsta de 14 ani este transferată echilibrului dinamic, iar la vârsta de 15 ani la capacitatea de diferenţiere kinetică a picioarelor. La jucătorii cu vârste între 11 şi 15 ani, putem prezice indicii generali de coordonare pe baza celor trei criterii selectate cu o mai mare certitudine (62,64 – 72,77%) şi cu eroare scăzută (1,523 – 1,973 puncte).

Concluzii. Calculele pot facilita identificarea talentelor, precum şi reducerea testelor specifice pentru capacităţile de coordonare.

Cuvinte cheie: hochei pe gheaţă, capacităţi de coordonare, performanţă sportivă, structură, predicţie, analiză de regresiei, analiză de corelaţie, băieţi.

Introduction

One of the main possibilities for the optimization of high performance sports activity is the improvement of the selection process. Current deficiencies, which have persisted for a long time in sport selection at national and local level, make us bring attention to three requirements of a successful selection (Bocu, 2010):

a) The possibility of a differentiated treatment of students during P.E. classes, according to their individual peculiarities and biomotor potential.

b) The possibility of applying scientific selection methods.

c) The possibility of supporting the selection performed by providing optimal environmental conditions, ensuring in this way the success of the selected individuals.

Ice-hockey is an extremely dynamic sport game requiring, among others, a high level of coordination abilities. Sport experts presume that further improvement of sport performance will be done by means of an increase in the quality of technical capability of sportsmen, for which coordination abilities create inevitable prerequisites. However, the current generation of children enter the beginning of their sport career with a worse initial level of fitness, particularly coordination, when compared to the generation of 15-20 years ago. This is the consequence of marked changes in their life style – children mostly prefer sitting and passive activities. School physical education is no more able to ensure high quality physical activity in the daily programme of children. Trainers and coaches are thus compelled to start their sport preparation from a very low level.

The game performance in ice-hockey depends on a number of factors (body composition, technical, fitness and personality prerequisites). Coordination abilities play an important role in the structure of sport performance. According to Jonath & Krempel (1991), speed contributes 20%, strength – 20%, endurance – 25%, flexibility – 10% and coordination - 25%. This is why it is inevitable to pay attention to the development of coordination factors, predominantly during the sensitive periods of their development.

Šimonek (2002) determined the following sensitive periods for the development of coordination abilities:

1. Kinesthetic-differentiation (starting from 7 years)
2. Rhythmic ability (strating from 9 years)
3. Reaction speed (starting from 9 years)
4. Balance ability (starting from 9 years)
5. Spatial orientation (starting from 10 years).

The structure of coordination performance in ice-hockey draws from the knowledge of sport performance, which forms a complex system of factors (Bukač & Dovalil, 1990). These are arranged in the system and there exist mutual relations among them, which manifest themselves in the level of sport performance. The share of the components of motor potential (aerobic endurance, speed abilities, strength abilities, coordination abilities) in sport performance in ice-hockey is equal according to the evaluation elaborated by Mangi, Jokl & Dayton (1987). The training time in pupil categories is distributed as follows: 46% complex load, 20% coordination, 12% endurance and 8% speed capacities (Kostka & Wohl, 1979).

The organization of requirements, which can be imagined as a structure drawing from a multifactorial theory, shows specific features in individual sport specializations. Knowing the hierarchy of individual factors (limiting and optimum factors for sport performance), but also their certain suppleness (which is, however, limited and decreases with the growth of performance) in the structure of sport performance, emphasizes their importance from the point of view of recognition. This differentiation, however, does not ensure their utilization in practice, since they are genetically conditioned and can also be more or less affected (Duncan & Lyons, 2009).

Searching for a sport talent is a problem of diagnosis of prerequisites for the given sport activity. Specification of procedures and criteria is inevitable for unveiling the inborn prerequisites of a potential talent. In talent search it is necessary to comprehensively take into account data on health status, functional and motor prerequisites, psychic immunity, personal characteristics and other factors (Starosta, 2003). Talent selection can be divided into two mutually affecting and consequential phases: the revealing of sport talents and the prediction of their sport performance (Hofmann & Schneider, 1985).

Attempts to specify the hierarchy and changing share of individual capacities in various sports have been recorded, while some more specific capacities in relation to different kinds of sports have been picked (Bracko & Fellingham, 1997). In spite of the complexity of coordination capacities, they seem to be relatively independent prerequisites of performance control of motor activity, while the dominant role is played by heredity (Bouchard et al., 1997). In children and youth, the following relatively independent coordination capacities have been derived: reaction speed, balance, spatial orientation, kinesthetic-differentiation, rhythmic capacities, and several others. When testing basic motor prerequisites, most of coaches avoid special coordination tests. Test batteries, which are used for talent selection for sport preparation at the age of 10-11,

detect the level of conditional motor capacities, but almost completely neglect the coordination capacities of children (Moravec, 2007).

The model of the structure of coordination capacities in ice-hockey is shown in Fig. 1.

Fig. 1 – Model of the structure of coordination capacities in ice-hockey (adapted by Šimonek according to Mangi-Jokl-Dayton, 1987).

Explanations

Level II. - special coordination capacities directly limiting sport performance in ice-hockey;

Level I. - general coordination capacities:

Level I.A - coordination capacities directly limiting sport performance,

Level I.B - coordination capacities significant (can be compensated) from the point of view of sport performance;

Level I.C – less significant coordination capacities.

The structure of coordination performance in ice-hockey draws from the knowledge of sport performance, which forms a complex system of factors (Bukač, 2008). These are arranged in the system and there exist mutual relations among them, which manifest themselves in the level of sport performance. The share of the components of motor potential (aerobic endurance, speed abilities, strength abilities, coordination abilities) in sport performance in ice-hockey is equal according to the evaluation elaborated by Mangi et al., (1987). The training time in pupil categories is distributed as follows: 46% complex load, 20% coordination, 12% endurance and 8% speed capacities (Tóth, 2010).

The most significant coordination capacities from the point of view of the complexity of modern ice-hockey include: reaction speed, spatial orientation, dynamic balance, the ability to rebuild motor programme and chaining of movements, personal prerequisites of an ice-hockey player (sensomotor abilities and skills). The results of a questionnaire decided the ranking of the most significant factors of sport performance in ice-hockey. Among the top capacities presented by coaches were strength capacities, kinestethetic-differentiation upon manipulating the puck, spatial orientation, reaction speed and coordination capacities.

Objectives

The aim of this article is to present several remarks concerning the structure of coordination capacities and possibilities of prediction of the overall coordination performance in ice-hockey in 11-15-year-old boys. The above mentioned issues should contribute to the solving of problems of talent search and recruitment, as well as finding the tests suitable for complementing the sets of special tests for ice-hockey.

Purpose

The purpose of this study is to find out, based on measurements and calculation, what are the roles of individual coordination prerequisites in the structure of sport performance in ice-hockey in players aged 11-15.

Material and methods

The research was carried out on a set of 283 selected pupils (11-year-olds=63, 12-year-olds=57, 13-year-olds =56, 14-year-olds=57, 15-year-olds=50) from sport classes within the Slovak Republic specializing in ice-hockey.

Coordination performance was observed using 7 motor criteria by Hirtz (1985): T1 – Bench walking with 3 turns (dynamic balance), T2 – Stopping a rolling ball (complex motor reaction capacity), T3 – Maintaining motor rhythm (rhythmic capacity), T4 – Shuttle run (spatial orientation), T5 – Precision standing broad jump (kinesthetic-differentiation of legs), T6 – Precision throw (kinesthetic-differentiation of arms), T7 – Time estimation - 5s (temporal parameter estimation).

Individual performances in coordination tests were transformed into points based on the 5-grade coordination standard for ice-hockey according to Šimonek et al., (2008) and figured in one test value, which presents an overall level of coordination performance (predictant "Y").

Dependence and share of individual coordination criteria to the overall coordination performance were disclosed using the technique of multiple correlation and regression analysis. The selection of three most valid coordination (predictors "$X_{(T1-T7)}$") criteria into prediction equations of coordination performance was performed using forward stepwise regression.

The structure of coordination performance (KV) for individual age categories is presented by means of a percentage pie chart. Prediction equations include calculated coefficients of partial regression (b_{0-3}), standard errors of regression (SEy) and determinants of multiple correlations (R^2). When interpreting the results of measurements and forming conclusions, logical methods were used. Numeral processing of data was evaluated using statistical programmes Microsoft Excel and SPSS 13.0.

Results

The level of coordination capacities in the talented youth aged 11-15 is presented in Table I. Using multiple correlation and regression analysis, the hierarchic structure of coordination capacities is presented from the point of view of ontogenesis (see Table II). Three coordination capacities, by which it is possible to predict overall coordination performance with sufficient reliability, were selected using stepwise regression. Regression equations for the prediction of overall coordination performance are presented in Table 3.

In hockey players, the most significant coordination capacities in ontogenesis are: rhythmic capacity, spatial orientation and temporal parameter estimation (Table I).

The structure of the above mentioned capacities is invariable in boys aged 11 and 12 years. At the age of 13, the share of spatial orientation capacity is transferred to complex motor reaction speed. At the age of 14 to 15, the stability of rhythmic and spatial orientation capacities is proved true. The share of significance of temporal parameter estimation at the age of 14 is transferred to dynamic balance and at the age of 15, to kinesthetic-differentiation capacity of legs.

The prediction equations include the following coordination capacities: dynamic balance T1, rhythmic capacity T3, spatial-orientation T4, and temporal parameter estimation T7 (Table I). In players aged 11 to 15 years, we are able to predict the overall coordination performance based on the three selected criteria (Table II), with a rather high reliability (62.64-72.77%) and low error (1.523-1.973).

Table II

Structure of coordination capacities in 11-15-year-old ice-hockey players.

KS	Age				
	11	12	13	14	15
T1	9.72[2]	12.75	13.52	16.80[2]	17.70[2]
T2	11.10	8.21[3]	22.59[2]	4.62	15.78
T3	20.26[3]	20.84	29.63[1]	18.83	19.12[3]
T4	15.42	21.93[2]	6.49	23.38[1]	18.09[1]
T5	9.93	7.62	7.45	15.97	17.75
T6	9.79	4.48	2.36	7.39[3]	4.41
T7	24.23[1]	24.16[1]	17.96[3]	13.02	7.16

Legend

KS – coordination capacities,
T1 – dynamic balance,
T2 - complex motor reaction,
T3 - rhythmic capacity,
T4 – spatial orientation,
T5 - kinesthetic-differentiation of legs,
T6 - kinesthetic-differentiation of arms,
T7 – temporal parameter estimation.
Three coordination capacities with the highest partial share in the structure of coordination capacities,
$x^{(1-3)}$ – Three coordination capacities selected in the prediction equation with the specification of ranking.

Discussion

So far, no similar research has been found in the available literature sources. It is thus difficult to compare our results with other ones. We determined the structure of individual coordination abilities and their share in the overall coordination performance of ice-hockey players aged 11 to 15. The results show that the most significant factors of performance in ice-hockey are rhythmic capacity, spatial orientation and temporal parameter estimation**.** In players aged 11 to 15 years, prediction can be done with a rather high reliability (62.64-72.77%) and low error (1.523-1.973). Coaches can use our results to assess the level of basic coordination abilities of their players and compare it with other teams and sportsmen. We believe that our research will also help coaches in the selection process.

Conclusions

1. In the age category of 11-15 years, entropic processes of coordination capacities manifest. At the beginning, these processes are characterized by disordering and towards the end of the category, by orderliness of the system, they are dynamically changing depending on age and growth of sport performance. Within this developmental process (genesis), not only their significance, but also the arrangement of individual factors of the structure of coordination performance changes.

2. In collective sports, the three most valid coordination capacities are rhythmic capacity, spatial orientation capacity and temporal parameter estimation.

3. It is possible to predict the overall coordination performance by means of temporal parameter estimation, dynamic balance, rhythmic capacity and spatial orientation capacity.

4. The prediction of the overall coordination performance by means of the three selected coordination test criteria proved to be satisfactory.

Table I

The level of coordination performance for the observed coordination criteria in 11-15-year-old ice-hockey players.

Age	Indicators	T1 (s)	T2 (cm)	T3 (s)	T4 (s)	T5 (cm)	T6 (cm)	T7 (s)
11	Mean value	10.74	174.11	1.25	8.35	4.98	68.82	0.89
	Std. Deviation	2.42	19.70	0.72	0.76	2.21	23.85	0.56
12	Mean value	11.5	164.42	1.17	8.24	4.57	69.04	0.58
	Std. Deviation	2.36	19.62	0.88	0.98	2.22	25.69	0.43
13	Mean value	10.17	155.11	1.11	7.94	4.57	62.76	0.44
	Std. Deviation	2.22	25.21	0.67	0.92	2.30	26.69	0.37
14	Mean value	9.68	156.00	1.19	8.18	4.48	64.19	0.47
	Std. Deviation	2.10	22.19	0.69	0.96	1.92	25.23	0.40
15	Mean value	8.29	137.74	0.94	7.86	4.20	62.04	0.57
	Std. Deviation	1.89	24.86	0.71	0.73	1.77	25.81	0.52

Table III

Regression equation for the prediction of overall coordination performance in 11-15-year-old ice-hockey players.

Age	Regression equation	KV
11	$Y = 10.032 + 1.270 * X_{(T7)} + 1.250 * X_{(T1)} + 1.003 * X_{(T3)}$; SEy:1.870; R^2:62.69	20.38
12	$Y = 9.576 + 1.532 * X_{(T7)} + 1.026 * X_{(T4)} + 1.175 * X_{(T2)}$; SEy:1.946; R^2:69.17	20.63
13	$Y = 12.293 + 1.006 * X_{(T3)} + 1.154 * X_{(T2)} + 0.942 * X_{(T7)}$; SEy:1.523; R^2:72.77	22.11
14	$Y = 8.986 + 1.377 * X_{(T4)} + 1.279 * X_{(T1)} + 1.213 * X_{(T6)}$; SEy:1.973; R^2:62.64	19.68
15	$Y = 9.393 + 1.384 * X_{(T4)} + 1.287 * X_{(T1)} + 1.202 * X_{(T3)}$; SEy:1.6010; R^2:70.78	20.60

Legend

Y = predicted coordination performance (points); b_0; b_1; b_2; b_3 = regression coefficients; $X_{(T1-T7)}$ = performance in the selected coordination tests (points); SEy = regression equation error (points); R^2 = reliability of the regression equation (%); KV = overall coordination performance (points).

Practical recommendations

• It is recommended that the existing test sets of special motor capacities used for the selection of talented children into classes specializing in ice-hockey or in continuous testing of specialized sport performance should be complemented with the following test criteria: T3 – rhythmic capacity, T4 – spatial orientation capacity and T7 – temporal parameter estimation.

• When selecting coordination tests for further age categories, we recommend to be governed by the height of shares of coordination criteria in the structure of coordination performance.

Conflicts of interests

There are no conflicts of interests.

Acknowledgement

The research was carried out as part of the research project KEGA no. 3/3022/05 entitled “Standards of coordination capacities for sport schools and classes“.

References

Blahuš P. O systému predikce a selekce potenciálních talentů. In Identifikace pohybových talentů. Praha: FTVŠ UK 2004, 8-18.

Bocu T. Premises of a successful Selection in Sports. Palestrica of the Third Millennium 2010; (11)2: 99-100.

Bouchard C, Malina R, Pérusse L. Genetics of fitness and physical performance. Human Kinetics, Champaign 1997, 345.

Bracko M, Fellingham G. Prediction of ice skating performance with off-ice testing in youth hockey players. Medicine & Science in Sports & Exercise 1997; 29:172.

Bukač L. Dlouhodobý trénink mládeže. Praha: Autocont CZ 2008, 72.

Duncan M, Lyons M. Advances in Strength and Conditioning Research. New York: Nova Publishers 2009, 260.

Hirtz P. Koordinative Fähigkeiten im Schulsport. 1. Auflage Berlin: Volkseigener Verlag 1985, 152.

Hofmann S, Schneider G. Eignungsbeurteilung und Auswahl im Nachwuchsleistungssport. Theorie Praxis Körperkultur 1985; 34:44-52.

Jonath V, Krempel R. Konditionstraining. Reinbeck bei Hamburg: Rewolt Sport Rororo 1991.

Mangi R, Jokl P, Dayton A. Sport Fitness and Training. New York: Pantheos Books 1987.

Moravec R. Koordinačné schopnosti. In Teória a didaktika výkonnostného a vrcholového športu. Bratislava: ICM AGENCY 2007, 151-158.

Starosta W. Motoryczne zdolnošči koordynacyjne. Warszava: IS, 2003, II, 568 .

Šimonek J. Model rozvoja koordinačných schopností v dlhodobej športovej príprave v športových hrách. Bratislava: Garmond 2002, 124-137.

Šimonek J, Halmova N, Kalinkova M, Czakova N, Paška L, Broďáni J. Normy koordinačných schopností pre 11-15-ročných športovcov. Nitra: UKF 2008,110.

Tóth I et al. Tréner ľadového hokeja: Vysokoškolská učebnica pre trénerov špecializácie v ľadovom hokeji. Bratislava: Slovenský zväz ľadového hokeja 2010, 240

Palestrica of the third millennium – Civilization and Sport
Vol. 13, no. 4, October-December 2012, 321–325

Influence of music therapy on anxiety and salivary cortisol, in stress induced by short term intense physical exercise

Influenţa terapiei prin muzică asupra stării de anxietate şi a cortizolului salivar, în stresul indus de efortul fizic intens şi de scurtă durată

Ramona Jurcău[1], Ioana Jurcău[2]
[1]*„Iuliu Haţieganu" University of Medicine and Pharmacy, Cluj-Napoca*
[2]*Pediatric Clinical Hospital, Cluj-Napoca*

Abstract

Background. Music therapy (MT) has been shown to have a beneficial effect on anxiety and cortisol levels.

Aims. The objective of the study is to highlight the modulation by MT of anxiety and salivary cortisol in stress induced by short term intense physical exercise, in sedentary subjects.

Methods. The subjects (n=22) were selected according to the inclusion criteria of the study. Stress was represented by short term intense physical exercise, performed with a Monark Ergomedic 839E cycle ergometer. The analyzed indicators were anxiety and salivary cortisol. Selected music was Concert No. 21 by W. A. Mozart. Statistical analysis was made on the basis of the Student test.

Results. Following administration of MT, anxiety and salivary cortisol were reduced immediately pre- and post-stress compared with subjects who did not follow any treatment.

Conclusions. 1). Under the influence of MT, compared with the untreated subjects, anxiety and salivary cortisol were significantly reduced immediately pre- and post-exercise, in stress caused by short term intense physical exercise, in sedentary persons. 2). It was proven that the influence is significantly more intense on anxiety than on salivary cortisol in the moments immediately pre- and post-stress, in the case of MT. 3). There are differences between the experimental group of MT and the untreated control group regarding the dynamic evolution of anxiety, as well as salivary cortisol. 4). We suggest the use of MT in the modulation of stress caused by short term intense physical exercise in persons with a sedentary life-style.

Keywords: stress, anxiety, short term intense physical exercise, salivary cortisol, music therapy.

Rezumat

Premize. Terapia prin muzică (MT) s-a dovedit a avea un efect benefic asupra anxietăţii şi cortizolemiei.

Obiective. Obiectivul studiului este de a pune în evidenţă modularea prin meloterapie a stării de anxietate şi a cortizolului salivar din stresul indus de efortul fizic intens şi de scurtă durată, la subiecţi sedentari.

Metodă. Subiecţii aleşi (n=22) au fost selectaţi conform cerinţelor studiului. Stresul a fost reprezentat de un efort fizic intens şi de scurtă durată, realizat cu un cicloergometru Ergomedic 839e Monark. Indicatorii analizaţi au fost starea de anxietate şi cortizolul salivar. Muzica selectată a fost Concertul nr.21. de W.A. Mozart. Evaluarea statistică s-a făcut pe baza testului Student.

Rezultate. În urma administrării MT starea de anxietate şi cortizolul salivar au fost diminuate imediat pre- şi poststres la subiecţii cărora li s-au administrat, comparativ cu subiecţii care nu au urmat nici un tratament.

Concluzii. 1). Sub influenţa MT, comparativ cu subiecţii netrataţi, starea de anxietate şi cortizolul salivar au fost semnificativ reduse, în momentele imediat pre- şi post efort, în cazul stresului cauzat de efortul fizic intens şi de scurtă durată, la persoane sedentare. 2). S-a dovedit că în cazul MT, influenţa este semnificativ mai intensă asupra stării de anxietate decât asupra cortizolului salivar, în momentele imediat pre- şi poststres. 3). Există diferenţe între lotul supus tratamentului cu MT şi lotul netratat, martor, atât pentru evoluţia dinamică a anxietăţii, cât şi pentru cea a cortizolului salivar. 4). Sugerăm utilizarea MT în modularea stresului cauzat de efortul fizic de scurtă durată şi intens, la persoane sedentare.

Cuvinte cheie: stres, efort fizic de scurtă durată şi intens, anxietate, cortizol salivar, terapie prin muzică.

Received: 2012, April 24; *Accepted for publication:* 2012, June 3
Address for correspondence: "Iuliu Haţieganu" University of Medicine and Pharmacy Cluj-Napoca 400012, Victor Babeş Str. no. 8
E-mail: ramona_mj@yahoo.com

Introduction

Music is widely used to enhance well-being, reduce stress, and distract patients from unpleasant symptoms (Kemper & Danhauer, 2005). Results indicate that listening to self-selected or classical music, after exposure to a stressor, significantly reduces negative emotional states and physiological arousal compared to listening to heavy metal music or sitting in silence (Labbé et al., 2007). The most beneficial music for the health of a patient is classical music, which holds an important role in music therapy (Trappe, 2010; Yoshie et al., 2009). Patients who would receive the most benefit from classical music include those with anxiety, depressive syndromes, cardiovascular disturbances, and those suffering from pain, stress, or sleep disturbances (Trappe, 2012). Mozart's music can reduce stress and tension in a busy and hectic general practice, piano concertos being the best as they are smooth, without rapid changes of rhythm and sound, and with greater continuity (Carelli, 2009). In the case of our country compared with other countries, music therapy is quite little used or unused in an institutionalized form.

Hypothesis

Music has always been a source of harmony for the body, mind and spirit and thus, a way of diminishing the effects of stress. W. A. Mozart's compositions have been shown to have beneficial effects on the human psyche, the Mozart effect being well-known. The influence of the music of this composer on stress induced by exercise has been less explored.

Objectives

We aim to evaluate the influence of music therapy through Concert No. 21 by W. A. Mozart on the psychological and hormonal dimension in stress induced by short term intense physical exercise, in sedentary subjects, by the comparative investigation of two indicators, anxiety and salivary cortisol.

Material and methods

The study and measurements were carried out in August 2010, in the Rai Mina General and Traditional Medicine Practice in Cluj-Napoca. The time interval of the research was from August 2010 until December 2010.

a) Groups

The participation of all subjects in the study was voluntary. Subjects were tested on the cycle ergometer. The selection of subjects was made based on the questionnaire for detecting the state of anxiety, STAY X 1. Persons with mental disorders, cortisone therapy and toxic addictions - alcohol, tobacco, drugs, coffee, were excluded from the trial. Two groups were explored: the control group (C), which received no therapy, and the experimental group (E), which was administered PP. Both groups were subjected to the same type of stress caused by short term intense physical exercise.

b) Subjects

The number of subjects in a group was 22 (11 men, 11 women), both for E and C. The mean age was 26.2 ± 2 for E and 21.6 ± 4 for C (Table I). Participants were asked not to consume alcohol, coffee, not to smoke and not to use any medication or antioxidant on the day before physical stress. All participants were sedentary subjects.

Table I

The number and type of subjects in the groups.

Group	Experimental stress (E)	Control (C)
No. of subjects	22	22
Mean age	23.4 ± 3	21.6 ± 4
Gender	Women (12) Men (12)	Women (12) Men (12)

c) Study design

For stress caused by physical exercise, a model of short term intense physical exercise on the cycle ergometer was chosen. Before physical testing, the participants performed a 5 min muscle warm-up, on the ergonomic bike, adjusted to 20 watts. After a 5 min break, followed the testing session carried out on a MONARK ERGOMEDIC 839E cycle ergometer. The test exercise was carried out at a pedaling rate of 60 rotations/min, starting with a power of 30 watts for three minutes, followed by a gradual increase of power up to 30 W more, every three minutes, and continued until the appearance of the feeling of fatigue.

The same music therapy was chosen for all subjects, namely Concert No. 21 by W. A. Mozart, which was listened to by headphones by each subject, at the same volume of sound, for a week, at the same time, starting one hour prior to testing and throughout physical exercise.

d) The indicators determination program was the same for C and E, being carried out as follows:

time 1 = first determination (Pre Stress 1 = T_1) - the day before the test, at 8.00 pm; time 2 = second determination (Pre Stress 2 = T_2) - 30 min before the start of the sample, at 8.00 in the morning of the day of stress exercise; time 3 = third determination (Post Stress 3 = T_3) and time 4 = fourth determination (Post Stress 4 = T_4) - 15 min, and 24 hours, respectively, after exercise.

e) Explorations

The examinations consisted of measuring psychological (anxiety) and endocrine (salivary cortisol) parameters. The values of the group before the administration of MT, M, and time T_2 were considered as the reference.

- *Psychological assessment*

The self-assessment questionnaire, STAI X1, X2 (Inventory of trait-state anxiety) was used for anxiety (A) (Spielberger, 1983). STAI scores range from a minimum score of 20 to a maximum score of 80 in both A-State and A-Trait scales. Subjects respond to each item of STAI, by assessing themselves on a 4-item Likert scale (Jurcau et al., 2012b). The A-State scale is balanced with 10 directly quoted items and 10 reverse scored items; the reverse scored items in the A-State scale are: 1, 2, 5, 8, 10, 11, 15, 16, 19, 20. The A-Trait-Scale has 13 directly quoted items and 7 reverse scored items, in which case it is not possible to have a fully balanced scale; the reverse scored items in the A-Trait scale are: 1, 6, 7, 10, 13, 16, 19. The psychometric properties of STAI are good, with a Cronbach α (Cronbach, 1951, 2004) of 0.83, higher than the conventional cut-off value of 0.70.

- *Hormonal evaluation*

Salivary cortisol was assessed at the Sinevo laboratory in Cluj-Napoca, by immunodetection by electrochemi-

luminescence (straps) (***, 2012; Carozza et al., 2010).

f) Statistical evaluation

- The results obtained were analyzed using the SPSS 13.0. statistical package.

- For continuous data examination, Student's t test was used.

- The differences were considered significant at $p<0.05$.

Results

Note that the *reference values* were those of C and the *reference time* was considered to be T_2.

a) Anxiety for C (Jurcău et al., 2012b) was significantly increased at time T_2, both compared with T_3 ($p<0.05$) and T_4 ($p<0.005$). The increase in the parameter values for E at T_2 was insignificant both compared to T_3 and T_4. At all peri-stress times, anxiety values in M were higher than in E, significant differences being found at times T_2 (T_2C - T_2E, $p<0.01$; T_3C - T_3E, $p<0.005$) (Fig. 1). There were no significant gender differences, for anxiety values.

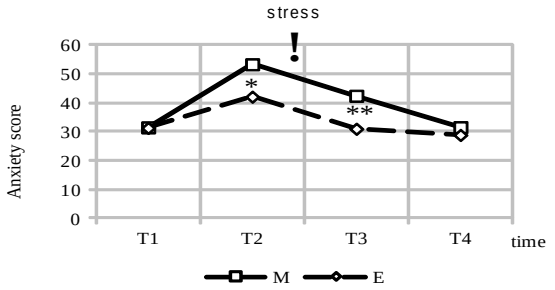


Fig. 1 - Anxiety score changes, under PP influence, in stress caused by short term intense physical exercise.
C = control group, E = experimental group, * $p<0.01$, ** $p<0.005$, * = T_2C - T_2E, ** = T_3C - T_3E; "stress" = time of short term intense physical exercise.

b) Salivary cortisol, for C (Jurcău et al., 2012b), significantly increased from T_2 to T_3 ($p<0.01$) and T_4 post-stress parameter values continued to be moderately significantly higher than T_2 pre-stress values ($p<0.05$). For E, the increase in the parameter value at T2 was insignificant compared to T1 and T3. At all peri-stress times, cortisol values for C were higher than for E (T_2M - T_2E, $p<0.05$; T_3M - T_3E, $p<0.005$) (Fig. 2). There were no significant gender differences, for salivary cortisol values.

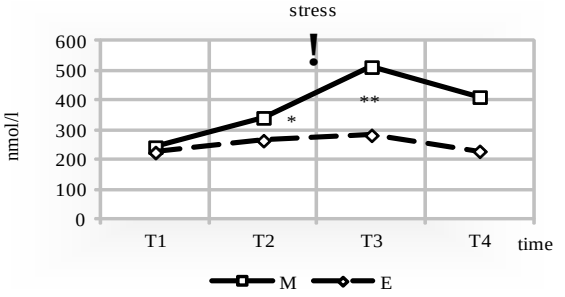


Fig. 2 - Salivary cortisol changes, under PP influence, in stress caused by short term intense physical exercise.
C = control group, E = experimental group, * $p<0.05$, ** $p<0.005$, * = T_2M -T_2E, ** = T_3M -T_3E; "stress" = time of short term intense physical exercise.

c) Comparison of peri-stress evolution of the analyzed indicators shows that MT has an influence on the dynamic values of the parameters in C compared to E. Thus, in the group treated with MT, stress impact is reduced, E-C compared differences being significant at T_2 and T_3, both for anxiety ($p<0.01$ = T_2M - T_2E, $p<0.005$ = T_3M - T_3E), and salivary cortisol ($p<0.05$ = T_2M - T_2E, $p<0.005$ = T_3M - T_3E) (Fig. 3).

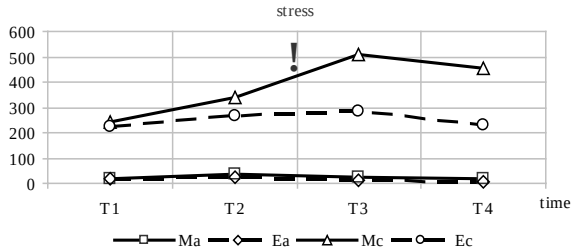


Fig. 3 - Comparison of variations in the studied parameters.
Groups: Ca = Control - anxiety, Cc = Control - salivary cortisol, Ea = experimental - anxiety, Ec = Experimental - salivary cortisol; "stress" = time of short term intense physical exercise.

d) Percentage differences between times T_2 and T_3 for C and E highlight the moments of the most powerful MT impact on the studied indicators. For E, the most intense MT impact is at T_3 for anxiety ($p<0.005$), and also at T_3 for salivary cortisol ($p<0.005$). The MT impact on E is significantly greater on anxiety ($p<0.01$) than on salivary cortisol (Jurcău et al., 2012b) (Fig. 4).

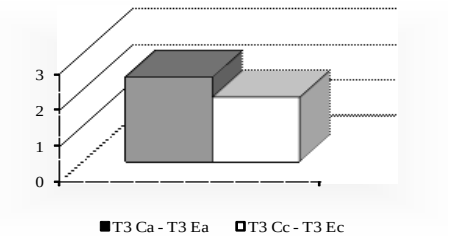


Fig. 4 – Percentage differences between C and E at times T_2 and T_3, for anxiety - Ca and Ea and salivary cortisol - Cc and Ec.

Discussion

The present study was based on the idea that music therapy is a useful, enjoyable and accessible procedure to cope with physical and emotional stress. Many and varied studies prove the beneficial roles of music therapy on the human being, to convert different forms of distress into eustress. Music therapy is a form of gentle therapy, affordable and effective. Numerous studies have already proved that music has profound psychological and physiological effects (Tusek et al., 1996; Snyder & Chlan, 1999; Toda, 1993).

Music is a non-pharmacological intervention that is considered an ideal therapy for reducing stress (Keegan, 2003). The central nervous system, however, has 2 main components involved in stress response: the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system (SNS) (Johnson et al., 1992). It turns out that music

affects indirect markers of activity of the SNS (Chlan, 1998; Wong, 2001; Almerud & Petersson, 2003). It has been assumed that the hard-wiring of emotion/music and cardiovascular neural systems probably involves many subcortical descending projections from the forebrain and hypothalamus (Holstege, 1987; Holstege et al., 1985; Swanson & Kuypers, 1980), and participation of frontal lobe, especially the medial agranular region, temporal lobe, the 'sigmoid' cortex, subcallosal gyrus and cingulate gyrus and septal area (de la Torre, Stefano, 2000; Deutsch et al, 1997). It is considered that the mechanism of action of relaxing music on the psyche occurs via opiate, the hormonal system and nitric oxide NO. This happens because the lateral hypothalamus has long been recognized for its role in the regulation of motivation and emotion and the autonomic concomitants of related behaviors (Saper et al., 1979), and NO has been shown to be a necessary molecule in the development of the auditory system (Fessenden & Schacht, 1998), which is required to enable music to act as a relaxant.

The results obtained by testing anxiety, under MT via Concert No. 21 by W. A. Mozart, are consistent with the data provided by recent studies related to changes of this parameter under the influence of music, especially the classics. Thus, providing music to caregivers may be a cost-effective and enjoyable strategy to improve empathy, compassion, and relationship-centered care (Kemper & Danhauer, 2005). In Ancient Greece, kithara (*κιθάρα* – a harp-like instrument held on the lap) and flute music was played during the Olympic Games with the goal of improving sporting activities. It has been shown that music leads to better athletic performances (about 15% improvement) (Trappe, 2012). Although there are wide variations in individual preferences, music appears to exert direct physiological effects through the autonomic nervous system (Kemper & Danhauer, 2005). Musical interventions have been used in health care settings to reduce patient pain, anxiety, and stress, although the exact mechanism of these therapies is not well understood (Nilsson, 2008). The highest benefit for health is visible in the case of classic music, meditation music, whereas heavy metal music or technosounds are ineffective or dangerous and will lead to stress and/or life threatening arrhythmias (Trappe, 2009). It has been shown that music composed by Bach, Mozart, and Italian composers is the most powerful in "treating" patients (Trappe, 2012). Mozart's music, and more specifically the piano concertos, is the best in Carelli's experience. The effects on patients are always very welcome; creating a relaxed environment and buffering any tension (Carelli, 2009).

The previous results of the authors in the field of stress induced by short term intense physical exercise in sedentary subjects (Jurcău et al., 2011; Jurcău et al., 2012a; Jurcău et al., 2012b) justify the interest of the authors in continuing to assess this type of stress seen through the prism of music therapy through Concert No. 21 of W. A. Mozart, especially on anxiety and salivary cortisol.

a) Anxiety

The effect of MT on anxiety has been a constant concern of specialized research.

It turned out that music is inexpensive, easily administered, and free of adverse effects, a mild anxiolytic (Matsota et al., 2012). In another study, music showed consistent physiological responses with different styles in most subjects, in whom responses were related to tempo (Kemper & Danhauer, 2005). Music effectively reduces anxiety (Fachner et al., 2012), improves mood (Kemper & Danhauer, 2005) and has positive effects on reducing patients' anxiety and pain in approximately half of the reviewed studies (Nilsson, 2008). The mean anxiety score was significantly decreased after the intervention of music, but not in the control group (Li & Dong, 2012). Listening to meditation music could reduce anxiety while increasing performance on an attention task (Telles et al., 2012). Autonomic responses are synchronized with music, which might therefore convey emotions through autonomic arousal during crescendos or rhythmic phrases (Trappe et al., 2009).

The results obtained by testing anxiety, under the action of MT through Concert No. 21 by W. A. Mozart, are in accordance with data of recent studies on the changes of this parameter under the action of music, particularly classical music. The difference in relation to the mentioned studies is that while they show the effect of MT on anxiety in general or in perioperative situations, our study demonstrates its effect of diminishing anxiety caused by stress induced by physical exercise. In addition, this study proves that the effect of Mozart's music, intensely studied through its action on memory, is also effective in reducing anxiety caused by stress induced by short duration intense physical exercise in sedentary subjects.

b) Salivary cortisol

The link between MT and *cortisol* has been investigated by many literature studies.

It was found that in the presence of music, the salivary cortisol level ceased to increase after the stressor, whereas in silence it continued to increase for 30 minutes (Khalfa, et al., 2003). Another study showed that listening to music resulted in a marked reduction in the salivary cortisol level and after one hour the relative decrease was similar to that observed in control (non-surgical) patients (Miluk-Kolasa et al., 1994). A short series of GIM sessions may positively affect mood and reduce cortisol levels in healthy adults (McKinney, 1997).

Our results obtained by testing on salivary cortisol, under the action of MT, are consistent with the data provided by the latest studies related to cortisol changes under MT. The difference compared to the mentioned studies is the fact that, while they show the MT action on blood cortisol, our study demonstrates the MT effect of decreasing salivary cortisol levels via Concert No. 21 by W. A. Mozart, in sedentary subjects undergoing stress induced by short term intense physical exercise.

Conclusions

1. Under the influence of MT, compared with untreated subjects, anxiety and salivary cortisol were significantly reduced immediately pre- and post-exercise, in stress caused by short term intense physical exercise, in sedentary persons.

2. It was demonstrated that the influence was significantly more intense on anxiety than on salivary cortisol in the moments immediately pre- and post-stress, in the case of MT.

3. There were differences in the dynamic evolution of anxiety as well as in salivary cortisol levels between MT subjects and the untreated control group.

4. We suggest the use of MT in the modulation of stress caused by short term intense physical exercise in sedentary persons.

Conflicts of interest

Nothing to declare.

Acknowledgement

The financing of the study was obtained from sponsorships.

References

Almerud S, Petersson K. Music therapy: a complementary treatment for mechanically ventilated intensive care patients. Intensive Crit Care Nurs. 2003; 19:21-30.

Carelli F. Mozart in my practice. Abs. Br J Gen Pract. 2009; 59(567):780.

Carrozza C, Corsello SM, Paragliola RM, Ingraudo F, Palumbo S, Locantore P, Sferrazza A, Pontecorvi A, Zuppi C. Clinical accuracy of midnight salivary cortisol measured by automated electrochemiluminescence immunoassay method in Cushing's syndrome. Ann Clin Biochem. 2010; 47: 228-232.

Chlan L. Effectiveness of a music therapy intervention on relaxation and anxiety for patients receiving ventilatory assistance. Heart Lung. 1998; 27:169-176.

Cronbach LJ. Coefficient alpha and the internal structure of tests. Psychometrika, 1951; 12:297-334.

Cronbach LJ. My current thoughts on coefficient alpha and successor procedures. Educational and Psychological Measurement. 2004; 64:391-418.

de la Torre JC, Stefano GB: Evidence that Alzheimer's disease is a microvascular disorder: The role of constituitive nitric oxide. Brain Res Rev. 2000; 11:1581-1585.

Deutsch DG, Goligorsky MS, Stefano GB et al. Production and physiological actions of anandamide in the vasculature of the rat kidney. J Clin Invest. 1997; 100:1538-1546.

Fachner J, Gold C, Erkkilä J. Music Therapy Modulates Fronto-Temporal Activity in Rest-EEG in Depressed Clients. Brain Topogr. 2012 Sep 16. [Epub ahead of print].

Fessenden JD, Schacht J. The nitric oxide/cyclic GMP pathway: a potential major regulator of cochlear physiology. Hearing Research. 1998; 118(1-2):168-176.

Holstege G, Meiners L, Tan K. Projections of the bed nucleus of the stria terminalis to the mesencephalon, pons, and medulla oblongata in the cat. Exp Brain Res. 1985; 58:379-391.

Holstege G. Some anatomical observations on the projections from the hypothalamus to brainstem and spinal cord: an HRP and autoradiographic tracing study in the cat. J Comp Neurol. 1987; 260:98-126.

Johnson E, Kamilaris T, Chrousos G, Gold P. Mechanisms of stress: a dynamic overview of hormonal and behavioral homeostasis. Neurosci Biobehav Rev. 1992; 16:115-130.

Jurcău R, Jurcău I, Bodescu C. Emotional and oxidative changes in stress produced by short term and heavy physical effort. Palestrica of the Third Millennium. 2011; 12 (4):349-354.

Jurcău R, Jurcău I, Bodescu C. Modificările frecvenţei cardiace şi cortizolului salivar în stresul cauzat de efortul fizic intens şi de scurtă durată, la persoane sedentare. Palestrica Mileniului III. 2012a; 13 (2):101-105.

Jurcău R, Jurcău I, Bodescu C. Modularea anxietăţii şi cortizolului salivar în stresul cauzat de efortul fizic, cu ajutorul unui preparat fitoterapic care conţine Rhodiola Rosea. Palestrica Mileniului III. 2012b; 13(3):213-218.

Keegan L. Therapies to reduce stress and anxiety. Crit Care Nurs Clin North Am. 2003; 15:321-327.

Kemper KJ, Danhauer SC. Music as therapy. South Med J. 2005; 98:282-288.

Khalfa S, Bella SD, Roy M, Peretz I, Lupien SJ. Effects of relaxing music on salivary cortisol level after psychological stress. Ann N Y Acad Sci. 2003; 999:374-376.

Labbé E, Schmidt N, Babin J, Pharr M. Coping with stress: the effectiveness of different types of music. Appl Psychophysiol Biofeedback. 2007; 32(3-4):163-168.

Li Y, Dong Y. Preoperative music intervention for patients undergoing cesarean delivery. Int J Gynaecol Obstet. 2012; 119(1):81-83.

Matsota P, Christodoulopoulou T, Smyrnioti ME, Pandazi A, Kanellopoulos I, Koursoumi E, Karamanis P, Kostopanagiotou G. Music's Use for Anesthesia and Analgesia. J Altern Complement Med. 2012 Sep 18. [Epub ahead of print].

McKinney CH, Antoni MH, Kumar M, Tims FC, McCabe PM. Effects of guided imagery and music (GIM) therapy on mood and cortisol in healthy adults. Health Psychol. 1997; 16(4):390-400.

Miluk-Kolasa B, Obminski Z, Stupnicki R, Golec L. Effects of music treatment on salivary cortisol in patients exposed to pre-surgical stress. Exp Clin Endocrinol. 1994; 102(2):118-120.

Nilsson U. The anxiety-and pain-reducing effects of music interventions: a systematic review. AORN J. 2008; 87(4):780-807.

Saper CB, Swanson LW, Cowan WM: An autoradiographic study of the efferent connections of the lateral hypothalamic area in the rat. J Comp Neurol, 1979; 183: 689-706.

Snyder M, Chlan L: Music Therapy. Annu Rev Nurs Res, 1999; 17: 3-25;

Spielberger CD, Gorsuch RL, Lushene PR, Vagg PR, Jacobs AG. Manual for the State-Trait Anxiety Inventory (Form Y). Consulting Psychologists Press. Inc. Palo Alto, 1983, 235.

Swanson LW, Kuypers HG: The paraventricular nucleus of the hypothalamus: cytoarchitectonic subdivisions and organization of projections to the pituitary, dorsal vagal complex, and spinal cord as demonstrated by retrograde fluorescence double-labeling methods. J Comp Neurol. 1980; 194:555-570.

Telles S, Bhardwaj AK, Kumar S, Kumar N, Balkrishna A. Performance in a substitution task and state anxiety following yoga in army recruits. Psychol Rep. 2012; 110(3):963-976.

Toda N. Mediation by nitric oxide of neurally-induced human cerebral artery relaxation. Experientia. 1993; 49:51-53

Trappe HJ. Music and health-what kind of music is helpful for whom? What music not? Dtsch Med Wochenschr. 2009; 134(51-52):2601-2606.

Trappe HJ. Role of music in intensive care medicine. Int J Crit Illn Inj Sci. 2012; 2(1):27-31.

Trappe HJ. The effects of music on the cardiovascular system and cardiovascular health. Heart. 2010; 96:1868-1871.

Tusek DL, Church JM, Strong SA et al. Guided Imagery A Significant Advance in the Care of Patients Undergoing Elective Colorectal Surgery. Diseases of the Colon and Rectum. 1996; 40:172-178.

Wong H, Lopez-Nahas V, Molassiotis A. Effects of music therapy on anxiety in ventilator-dependent patients. Heart Lung. 2001; 30:376-387.

Yoshie M, Kudo K, Ohtsuki T. Motor/autonomic stress responses in a competitive piano performance. Ann NY Acad Sci. 2009; 1169:368-371.

***. Laborator Synevo. Referinţele specifice tehnologiei de lucru utilizate. Ref Type: Catalog, 2012

Palestrica of the third millennium – Civilization and Sport
Vol. 13, no. 4, October-December 2012, 326–332

An analysis of throws/goals scored by the male handball team HCM Constanţa during the "Champions League" competition 2011-2012

Analiza aruncărilor la poartă/goluri marcate, la echipa de handbal masculin HCM Constanţa în cadrul competiţiei „Liga Campionilor" 2011-2012

Ioana-Maria Curiţianu, Mircea Neamţu
Faculty of Physical Education and Mountain Sport, "Transylvania" University, Braşov

Abstract

Background. We started from the supposition that because of the changes that appeared in men's handball on an international level, the growth rate, the mobility of the players in different game systems in defense and offence determined us to do a critical analysis on the evolution of the Romanian male handball team HCM Constanţa, Romania's Champion team, in the Champions League Competition 2011-2012.

Aims. The paper aims to show the evolution of the players that play in the left wing, right wing and pivot positions in the HCM Constanţa team. The data of this paper are based on the recorded games from the Champions League competition 2011-2012 and on the observation charts made during the competition.

Methods. To achieve this study on the evolution of the players that play in the left wing, right wing and pivot positions in the HCM Constanţa team, in round trip matches with teams that compose the qualified Group C from the Champions League competition 2011-2012, we used the following research methods: the observation method made by studying the video recordings of the match, in order to establish the concept of team play, game systems used, technical and tactical means to drive in different phases of the game, the statistical data collected was used to analyze individual performance, game records using an observation chart, made to obtain data on individual developments; statistical calculations helped us to draw the necessary conclusions on the evolution of players in the left wing, right wing and pivot positions of the HCM Constanţa team.

Results. The interpretation of the results led to establishing the evolution of the players in the right wing, left wing and pivot positions of the HCM Constanţa male team. Players in the right wing position achieved using the fast break a percentage of 50% and 60% and the evolution of the pivot players is shown by the percentages of 80% and 56.2% obtained using the 6 m throw. Regarding the left wing players at the side throws, they had a percentage of 26.6% and 37.5%.

Conclusions. After analyzing the video games and the observation charts we can say that the performance of the players in the left wing, right wing and pivot positions of the HCM Constanţa team was a low one. Regarding the technical knowledge, these players have a good technical knowledge, in offence and defense. The players use various procedures according to the game situations during the competition. Tactically speaking, both wing and pivot players are good in individual and collective defense tactics, being a part of combinations with all of their teammates.

Keywords: high performance sport, handball, efficiency.

Rezumat

Premize. S-a pornit de la presupunerea că datorită schimbărilor survenite în jocul de handbal masculin la nivel internaţional, creşterea ritmului, a mobilităţii jucătorilor în sistemele de joc, atât în fazele de atac, cât şi în cele de apărare, ne-au determinat să facem o analiză critică a evoluţiei echipei de handbal masculin Handbal Club Municipal (HCM) Constanţa, echipa campioană a României, în cadrul „Ligii Campionilor" 2011-2012.

Obiective. Cercetarea a avut ca obiectiv studierea evoluţiei jucătorilor care activează pe posturile de extremă stângă, extremă dreaptă şi pivot în cadrul echipei HCM Constanţa.

Metode. Au fost folosite următoarele metode de cercetare: studiul înregistrărilor video realizate în timpul meciurilor, fişa de observaţie utilizată pentru obţinerea datelor privind evoluţiile individuale, analiza rezultatelor obţinute din calculele statistice relative (procentuale).

Rezultate. Interpretarea datelor obţinute a dus la stabilirea evoluţiei jucătorilor care activează pe posturile de extremă stângă, extremă dreaptă şi pivot, jucători componenţi ai echipei de handbal masculin HCM Constanţa. Jucătorii care activează pe postul de extremă dreaptă au obţinut la aruncările de pe contraatac un procentaj de 50% şi 60%, iar evoluţia jucătorilor de pe

Received: 2012, August 30; *Accepted for publication:* 2012, October 15
Address for correspondence: Faculty of Physical Education and Mountain Sport, Transylvania University, Braşov, Colina Universităţii str. no.1, code 500068
E-mail: ioana.curitianu@gmail.com

postul de pivot este arătată de procentajele de 80% şi 56,2% obţinute la aruncările de la semicercul de 6 m. În ceea ce priveşte postul de extremă stângă, în cadrul aruncărilor de pe partea laterală a terenului, aceştia au avut un procentaj de 26,6%, respectiv 37,5%.

Concluzii. Evoluţia jucătorilor care activează pe posturile de extremă stângă, dreaptă şi pivot, componenţi ai echipei HCM Constanţa s-a realizat la un nivel scăzut. Din punct de vedere al tehnicii însuşite, aceşti jucători dispun de un bagaj bogat de procedee tehnice, atât în atac, cât şi în apărare. Jucătorii de pe posturile de extreme şi pivot au utilizat în timpul competiţiei Liga Campionilor procedee diverse, în funcţie de situaţiile de joc. Din punct de vedere tactic, atât extremele, cât şi pivoţii sunt buni cunoscători ai tacticii individuale şi colective de atac, intrând în combinaţie de joc cu majoritatea coechipierilor.

Cuvinte cheie: sport de înaltă performanţă, handbal, eficacitate.

Introduction

Sports training is a complex process performed systematically and continuously graded to adapt the athlete body to intense physical and mental effort involved in participating in competitions (Dragnea & Mate-Teodorescu, 2002).

Adrian Dragnea (1996) believes that sports performance can be defined as a bio-psycho-social value achieved in an official competition as a result of multiple abilities caused and appreciated on the basis of rigorous criteria or established evaluation criteria.

Handball is a sports game that is part of the games invented to satisfy human needs of search, change, innovation. Through its quality of game it occupies a well deserved place in the field of sport education, implicitly of civilization and sport culture (Balint, 2004).

In high performance sport, great importance is given to physical condition. This is actually the concern for adapting the athlete's body to increased physical and mental efforts in which all the segments of the human body are involved (Acsinte & Alexander, 2007).

In terms of physical performance, handball is a complex sport that requires maximum intensity efforts in a short time period in which players jump, run and throw the ball with speed, followed by moments of low intensity (Jacobs et al., 1982; Chaouachi et al., 2009).

Due to a large number of players in the game with complex objectives and various ways of cooperation and confrontation, it is not plain to analyze the technical and tactical activities of the players and the entire handball team (Foretić et al., 2010).

The current stage of knowledge concerning the thematic area includes research regarding the efficiency of the handball players' positions (Gruić et al., 2006; Ohnjec et al., 2008), of the throwing areas (Pokrajak, 2008; Rogulj, 2000) and the efficiency of different throwing ways (Delija & Šimenc, 1994; Vuletic et al., 2003). Other studies have been conducted on the differences between the effectiveness of the team throws (Apitzs & Liu, 1997; Taborsky, 2008), the influence of tactical elements and the influence of completing the attack on the final result of a game (Srhoj et al., 2001; Rogulj et al. 2004, Rogulj & Srhoj, 2009).

Handball is characterized by a complexity of movements performed under changing conditions of strength and velocity, determined by the collaboration between teammates and direct combat with the opponents. The modern game of handball requires special somatic biotypes that operate in a fast pace, combining in terms of motricity speed and strength with resistance and skills. To be able to deal with such biological requirements, handball players need to have outstanding physical and mental skills (Hantău, 2000).

The tendencies and development directions of international handball are: fast game that increases constantly, individual technique aiming at perfection and maximum efficiency, technical and tactical training of the players for both the requirements of the position and good performance in other positions required by the actual situation of the game, general and specific physical training necessary to sustain high speed actions, variety and the mobility game systems, players' tasks in positions within the phases of the game resulting from the general requirements of the game (after Sotiriu, 1998).

The use of individual scores to achieve a unique technical action may also explain the effectiveness of the attack. The technique is a complex characteristic in ball games and therefore the use of one specific technique based on the individual scores concerning several relevant skills would be useful (Zapartidis et al., 2009, Cherif et al., 2011). Establishing the factors that affect the ball speed as well as distributing the role of players in the team, the position in which players perform, muscle strength and anthropometric characteristics would also be important (Malina et al., 2007).

Handball played by male teams is much appreciated by the public, because during its course players mobilize and show superior physical strength available to win a confrontation sport (Balint, 2005).

Exercise in the handball game

The study of physical exercise performed by players during a handball game is difficult because of the direct physical contact between players, which prevents the setting of various devices or medical equipment such as catheters, mobile devices to measure oxygen consumption. Also, the ball played with the hands makes it impossible to attach these devices.

In terms of energy, physical exercise in the handball game has a mixed structure, anaerobic exercise being used in over 60% of the actual play and aerobic exercise in 40% of the time, which shows a very good anaerobic capacity paralleled by a very good aerobic capacity. In other words, high performance in handball is conditioned by: speed, strength-speed, endurance-strength, endurance-speed, speed, reaction rate, displacement and repetition speed, based on good general physical endurance (Drăgan, 2002).

Exercise in the handball game has a high intensity. Handball is a fast, explosive, high-energy game with

repeated ongoing actions, for 20 to 40 times during a match. Recovery periods are of 3-7 seconds (Bompa, 2003).

In handball, training is normally developed during four stages

Stage I is training or basic training depending on the specific branch of sport and represents the initial stage of sports training with the primary general task to create the premises for the long term development of performance capacity. This stage lasts about three years and ends before puberty. The most important objective of this phase is to increase exercise capacity and develop fine coordination of movements related to the technical initiation in the sport branch.

Stage II is specialized training or early specialization in a sport branch and involves the beginning of specialization, the development of exercise capacity, training of the ability of fine coordination of specific motion in the branch of sport, development of tactical and technical capacity, development of speed and strength under speed, to which the following psychological objectives are added: developing cognitive processes, maintaining the affective balance and developing a correct motivational system.

Stage III is extensive and specialized training oriented towards high performance and ensures the transition to the training stage of high performance, reaching the values of international recognition. In this stage, the volume and intensity of training significantly increase along with the increased competitive activity. The programming and planning of training will be determined by competitive activity performance and therefore the periodization and cyclicity of training will primarily depend on the competition calendar, taking into account the principles for obtaining physical fitness in sports competitions (Alexa, 2000).

Stage IV of sports training, which is the subject of this research, corresponds to the training of the Handball Club Municipality (HCM) Constanţa team and involves working with devoted high performance athletes. This stage is the last stage of building on long-term training. In this research, the content and structure of training are focused on achieving maximum sports performance. Planning and training are personalized and the entire planning process is based on the competition calendar and the achievement of maximum physical fitness in the most important competition or in the series of competitions to be attended (Alexa, 2000).

The main tasks of high performance training are: the establishment by the athletes together with the coach and other actors of performance of the targets and necessary conditions for its achievement, the increase of performance capacity to the maximum level within each microcycle, the enhancement of exercise complexity to a high level by using with priority the competition means, the development of resistance to stress caused by training, competition and mass media by using some efficient means for physical and psychological recovery (psychotherapy, pharmacological), the clarification and understanding of contractual relationships by employing specialists in the field, the training of proper attitudes for the celebrity status, intended for athletes who are non-amateurs in most of the cases (professionals).

Professional athletes take to a large extent their own training responsibilities considering that sports practice ensures the necessary living resources.

Profile of the players in the wing and pivot positions (in attack)

The model of the player in a specific position must be entirely respected, but at the same time, the player must be able to act (if the tactical situation requires it) in other attack-defense positions. This increases the strength of attack or the solidity of defense. The profile of the handball player falls on the same coordinates of the modern approach of content in the handball game. Establishing a pattern means setting a maximum of requirements of the activity, which demands the knowledge of the possibilities of development of the body, the development of motor indices, the content of motor abilities and skills that must be learned by the subjects (Bota, 1984).

Several studies have shown differences in actions and distances covered in the game according to the specific game position of the players (Cambel, 1985, Luigi et al., 2008; Manchado et al., 2007; Sibila et al., 2004, Ziv & Lidor, 2009).

Pivots are positioned behind the opponents' line of defense and there they must maintain their balance position to withstand defense pressure by pushing and collision. The muscle mass combined with low center of gravity, strength in the upper body and relatively large body mass are needed to succeed in the playing conditions (Christodulidis et al., 2009).

The pivot can organize the game, may initiate tactical combinations, can come to the 9 m line to throw on goal and initiate specific actions that 9 m players use.

The wings become key markers using: throwing on goal by increasing the throwing angle and landing on the center on the 6 m line, throwing between the arms and head of the goalkeeper, lifted throws, throwing with vault over the goalkeeper, throwing with the ground and bypass effect, air throwing, throwing after outflanking at the 9 m line or by using the breakthroughs at the 6 m line, they are formidable particularly active attack peaks in phases I and II of the game.

The highest VO2 max values were observed in players that were active on the sides of the court. These differences are conclusive because of the specific tasks that wing players have during a match. Wings cover the greatest distance during a game compared to pivots and backcourt players. During the transition between defense and attack they are the only players that run from one end to another (about 35 m/transition), while pivot players must cover the area between the two 6 meter lines, which means that they must run less than 12 meters during any twists and turns that may occur in the game (Spori et al., 2010).

For the game in attack the wing player has the following tasks - requirements: fast and anticipated departure using fast break - every time the opponent loses possession - and conducting movement at high speed, even in situations in which he does not receive passes, if engaged, he occupies a position at the 9 m line, close to the side line, breaks through the 6 m line only if the lateral defender has not retreated or

moved to the backcourt side, performs breakthroughs with demarcation at the 6 m line in cases in which the defense is unorganized or applies an advanced temporary area, in organized attack he occupies a position closer to the goal line attacking the outside lanes, initiates successive breakthroughs by threatening the penetration lane between two defenders and quickly passes the ball, in the dynamic attack - in circulation – enters near the semicircle of 6 m, temporarily occupying a pivot position - performs block actions for backcourt players and continues his movement parallel to the 6 m line from one wing to another, in a 1x1 relation, in appropriate cases for throwing he breaks through lanes, surpassing defenders, either interior or exterior, throwing is made by jumping while increasing the shot angle.

The technical and tactical tasks of the wing player include: single and double firewall, single and double block - with pivot and line player for the backcourt player, combinations with two wing players – line player; wing - pivot; wing – backcourt player, specific combinations between three players backcourt player - pivot – wing player, line player – wing player – backcourt player, line player – wing player - pivot, backcourt player - backcourt player – wing player, combinations with the backcourt player from the opposite side to which single and double firewall is added, block – departure from the block.

The attributions – requirements of the pivot player are the following: in fast break situations he runs at high speed according to the movement of the other 9 m players and plays the ball in attack, positions himself on the 6 m line at the end of phase II for a possible pass from the 9 m players, in positional attack he stands between the lateral and backcourt defenders or in the center of defense, in special situations he provides ball possession by coming to the 9 m line or blocks the movement of defense players in the center or on the sides, recovers the ball and passes it safely for completing the attack, delays the launch of the opponent's fast break - in case of possession loss – using regulatory actions in the first phase, then comes to defense (Balint, 2004).

It is necessary to master the following technical and tactical actions: combinations between two players – with the wing, exterior block of the backcourt defender for the wing to break through, firewall on the backcourt or central defender for throwing, combination with the backcourt player - simple and double firewall with the wing or line player, crossing followed by firewall; block for the breakthroughs; block - departure, combinations with the line player - block (Balint, 2004).

Hypothesis

We started from the assumption that by analyzing the players of the male HCM Constanţa handball team playing in the left wing, right wing and pivot positions and observing the technique and tactics used by them, we could bring improvements to their individual evolution and to the evolution of the entire team through the possibility of self-performance, allowing them to repair previous faults through actions chosen according to the defenders' movements and depending on the game situations.

Material and methods

a) *Research Protocol*

The research was conducted during the competition year 2011-2012, studying the evolution of the HCM Constanţa team in the "Champions League" competition. The reason for choosing this team for research is that this is the only men's handball team in Romania that plays in this European competition. In the Champions League competition 2011-2012, based on the results obtained, the HCM Constanţa team has failed to leave the qualifying group.

b) *Subjects*

The subjects of the research were members of the Romanian champion team, HCM Constanţa, GV (28 years) and TL (31 years), who play right wing position, NM (32 years) and IA (32 years) as pivot players, BG (33 years) and SA (30 years) in the left wing position. The results obtained from the observation sheets concerning the evolution of the six players of the HCM Constanţa team are shown below.

c) *Methods*

- Documentation through the study of the websites of the European Handball Federation and the International Handball Federation for the collection of data concerning the composition and evolution of the HCM Constanţa team in the matches played in the Champions League competition (1, 2).

- Observations made by studying the video recordings of the matches.

- Recording sheets of the games, used for obtaining data on individual play, analyses of the results obtained from statistical calculations, based on which the conclusions concerning the evolution of the wing players and pivot players of the HCM Constanţa team were drawn.

d) *Statistical methods*

Statistical calculation of the collected data was necessary to analyze individual performance using the following techniques: percentage calculation of the throws on goal, which indicated efficiency, as the ratio between the number of goals and the total number of throws. This calculation was made using the formula: % = Number of scored goals x 100/ Total throws, using Microsoft Excel.

Results

Presentation of the results obtained from the observation sheets

Table I presents the efficiency of the teams that played in Group C of qualification in the Champions League competition 2011-2012. It can be seen that the HCM Constanţa team occupies the last position in the group, with a percentage of 82.10%.

Table I

The efficiency of teams playing in Group C of qualification in the "Champions League" competition 2011-2012.

Teams in Grup C of qualification	No. of throws/ No. of goals	%
HSV Hamburg	310/245	79
RK Cimos Koper	287/248	86
HC Metalurg	281/254	90
Orlen Wisla Plock	290/269	92.70
St. Petersburg HC	301/241	80
HCM Constanţa	286/235	82.10

Table II

Analysis of the evolution of players in the wing and pivot positions in the Champions League competition.

Name	Total		%	Goals/Throws (G/T)											
	Goals (G)	Throws (T)		7 m throws			6 m line throws			Wing throws			Fast break throws		
				G	T	%	G	T	%	G	T	%	G	T	%
GV	20	39	51.20	12	15	80	1	2	50	4	10	40	3	6	50
NM	15	18	83.30	-	-	-	14	17	82.30	-	-	-	1	1	100
TL	27	52	51.90	9	16	56.20	2	2	100	11	23	47.80	3	5	60
IA	19	30	63.30	-	-	-	17	25	68	1	2	50	2	3	66.60
BG	14	29	48.20	-	-	-	2	5	40	4	15	26.60	8	9	88.80
SA	17	37	45.90	-	-	-	4	7	57	9	24	37.50	2	3	66.60

Table II presents the performance of the HCM Constanţa team players that play in the left wing, right wing and pivot positions, after ten matches held in the Champions League Competition 2011-2012, and the criteria used for analyzing the evolution of these players are 7 m throws, 6m line throws, wing position throws and fast break throws.

In the HCM Constanţa team, the 7 m throws are performed by players in the right wing position, TL and GV, players with high tactical and technical skills that achieved high efficiency percentages of over 50% (Table III).

Table III

Efficiency of 7 m throws.

Name	7 m throws		
	Goals	throws	%
GV	12	15	80
TL	9	16	56.20

The importance of pivot players in the modern handball game is decisive, creating numerical superiority through ball and player circulation, by using blocks and departures from the block. Of the two pivots, NM had a percentage of 82.30% for the 6 m line throws (Table IV).

Table IV

Efficiency of throwing from the 6 m line.

Name	Throws from the 6 m line		
	Goals	Throws	%
GV	1	2	50
NM	14	17	82.30
TL	2	2	100
IA	17	25	68
BG	2	5	40
SA	4	7	57

The role of wing players in the handball game has become particularly important. Therefore, the static handball game based on throws from the center of the court has been gradually replaced with a wide game, using the side lanes. For the throws performed from the wing position, player TL obtained the best percentage, scoring 11 goals out of 23 throws (Table V).

Table V

Efficiency of throwing from the wings.

Name	Throws from the wings		
	Goals	Throws	%
GV	4	10	40
NM	-	-	-
TL	11	23	47.80
IA	1	2	50
BG	4	15	26.60
SA	9	24	37.50

Fast break in the tactical version of each team became a game phase in attack used by most teams. Completion being individual, we refer to the values of its effectiveness. Analyzing the efficiency of the throws performed after a fast attack, we conclude that the percentage of the players of the HCM Constanţa team is a good one, the left wing BG scoring 8 goals from a total of 9 throws (Table VI).

Table VI

Efficiency of throwing using fast break.

Name	Throws using fast break		
	Goals	Throws	%
GV	3	6	50
NM	1	1	100
TL	3	5	60
IA	2	3	66.60
BG	8	9	88.80
SA	2	3	66.60

The efficiency of throws performed at distance (from the 9 m line) by the players under study evidences very low percentages, indicating that the HCM Constanţa team does not use collective tactical actions to engage the players positioned on the sides of the court (Table VII).

Table VII

Efficiency of throws from the 9 m line.

Name	Throws from the 9 m line		
	Goals	Throws	%
GV	1	6	17
TL	2	6	33
SA	2	3	66.60

Discussion

Table I presents the effectiveness of the teams that played in Group C of qualification in the Champions League competition 2011-2012, after ten matches. The team with the best percentage was Orlen Wisla Plock with 92.7%, followed by HC Metalurg with 90%, the HCM Constanţa team ranking fifth in terms of effectiveness of the throws on goal, with 286 throws, 235 goals scored, and a percentage of 82.10%.

Table II analyzes the performance of the players of the HCM Constanţa team, who played in the left wing, right wing and pivot positions in the ten matches of the Champions League qualifying group. The best percentage was obtained by the pivot NM, 83.3%, representing the throws on goal from the 6 m line, with 14 scored goals out of 17 throws, and one throw from fast break that was successful. The lowest percentage of 45.9% was achieved by the left wing SA, who scored 17 goals out of 37 throws.

Regarding the effectiveness of the players in terms of 7 m throws, the two players in the right wing position, GV and

TL, had 80% and 56.2%. The two wings performed better in this area, managing to score 12 goals out of 15 throws and 9 goals out of 16 throws, respectively (Table III).

Table IV presents the throws performed from the 6 m line. The two pivots from the HCM Constanţa team, NM and AI, had the best percentage, 82.3% and 68%, and the right wing TL had a 100% percentage compared to players GV, 50%, BG, 40% and SA, 57.1%. The analysis of these results shows that the team players have good technical and tactical skills because the two pivots use different procedures of throwing on goal under great adversity.

Table V shows the effectiveness of the players in the left wing, right wing and pivot positions of the HCM Constanţa team. We observed that players GV and TL (right wing position), with a percentage of 40% and 47.8%, had a satisfactory evolution compared to players BG and SA (left wing position), with a percentage of 26.6% and 37.5%: left wing BG managed to score 4 goals out of 15 throws in ten matches, and SA 9 goals out of 24 throws. Regarding the pivot player IA, he obtained a 50% percentage, scoring once out of two throws using the method of throwing on goal from the wing position.

Table VI shows the effectiveness of the players by analyzing the throws of the six players using fast break. Fast break represents phase I of the attack and at international level is frequently used and exploited each time. The results obtained showed that the pivot NM achieved a maximum percentage with a throw and a scored goal. The player in the left wing position, BG, scored 8 goals out of 9 throws, achieving a percentage of 88.6%, while the lowest percentage was achieved by the right wing GV, 50%.

Table VII examines the throws from the 9 m line of the players in the left wing, right wing and pivot positions. After an analysis of the ten matches in the Champions League competition 2011-2012, we found that the two right wings had a percentage of 16.6% for GV and 33.3% for TL, and left wing player SA had a percentage of 66, 6%, scoring 2 goals out of 3 throws.

Conclusions

1. The number of goals scored from 7 m throws performed by the studied players depended on several factors: collective actions (or couples of positions), individual actions, fast breaks illegally stopped or poorly improved individual technique of the defenders, overcome by the strength or individual technique of the attackers.

2. The effectiveness of the throws performed from the right wing position, by players TL and GV, with a total of 20 and 27 goals and a percentage of 51.2% and 51.9%, indicates a wide tendency of the game that the team provides and the value of the players occupying this position.

3. The throws performed from the 6 m line presented in the observation chart show the performance of pivot players IA and NM. The percentage of efficiency has a large margin (68%-82.3%). The 6 m throw percentages are due to collective tactics aimed at placing in a good position the pivots and to the exceptional qualities of the players in this position.

4. Fast break has become a phase of attack that is widely used, both with a wing and two wings, as direct and intermediate fast break. Completion being individual, we refer to the values of its effectiveness. Both players in the right wing position, left wing position and pivot position have a good efficiency, achieving a percentage higher than 50%. However, attack is a phase that requires training because given the current tendencies of world handball play, errors and failures in clear situations of goal can lose a match.

Conflicts of interests

Nothing to declare.

Acknowledgement

This article is based on the partial results of the first author's PhD thesis, which is ongoing.

References

Acsinte A, Alexandru E. Physical condition in high performance team handball. Vienna/Austria - Publisher, EHF web Periodical, 2007.

Alexe N. Teoria şi metodica antrenamentului sportiv modern. Ed. Didactică şi Pedagogică. Bucureşti, 2000.

Apitzs E, Liu WH. Correlation between field dependance-independance and handball shooting by Swedish national male players. Perceptual and Motor Skills. 1997; 84:1395-1398.

Bara E., Lucrare de specialitate pentru obţinerea competenţelor.

Balint E. Instruirea în jocul de handbal. Conţinut Tehnic. Ed. Universităţii Transilvania. Braşov, 2004, 5, 33-39.

Balint E. Instruirea în jocul de handbal. Conţinut Tactic. Ed. Universităţii Transilvania. Braşov, 2005, 5.

Bompa T. Performanţa în jocurile sportive. Ed. Exponto SNA. Bucureşti, 2003.

Bota I. Handbal - modele de joc şi pregătire. Ed. Sport-Turism. Bucureşti, 1984, 23.

Cambel K. An assessment of the movement requirements of elite team handball athletes. Sports Medicine. 1985; 3:23-30.

Chaouachi A, Brughelli M, Levin G, Boudhina N, Cronin J, Chamari K. Anthropometric, physiological and performance characteristics of elite team-handball players. J Sports Sci. 2009; 27(2):151-157.

Cherif M, Gomri D, Aouidet A, Said Mohamed. The Offensive Efficiency of the High-Level Handball Players of the Front and the Rear Lines. Asian J Sports Med. 2011; 2(4):241-248.

Christodoulidis T, Karras D, Kororos P, Skoufas D, Toganidis T, Vareltzis I, Zapartidis I. Profile Of Young Female Handball Players By Playing Position. Serbian Journal of Sports Sciences. 2009; 2:53-60.

Delija K, Šimenc Z. Utjecaj nekih općih i situacijskih motoričkih sposobnosti i znanja na uspjeh u rukometu. Kinesiology. 1994; 26:51-54.

Drăgan I. Medicină sportivă. Ed. Medicală. Bucureşti, 2002, 662.

Dragnea A. Antrenamentul sportiv. Ed. Didactică şi Pedagogică. Bucureşti, 1996, 61.

Dragnea A, Mate-Teodorescu S. Teoria Sportului. Ed. FEST. Bucureşti, 2002, 155.

Foretić N, Rogulj N, Trninic M. The influence of situation efficiency on the result of a handball match. Sport Science 2010; 3(2):45-51.

Gruić I, Vuleta D, Milanović D. Performance indicators of teams at the 2003 men´s world handball championship in Portugal. Kinesiology. 2006; 38(2):164-175.

Hantău C. Handbal. Ed. Alphina. Bucureşti, 2000, 76.

Jacobs I, Westlin N, Rasmusson M, Houghton B. Muscle glycogen and diet in elite players. Eur J Appl Physiol. 1982; 48(3): 297-302.

Luig P, Manchado-Lopez C, Perse M, Kristan M, Schander I, Zimmermann M. Motion characteristics according to playing position in international men's team handball. 13th Annual Congress of the European College of Sports Science. Portugal-Estoril. Book of Abstract. 2008, 255.

Malina RM, Ribeiro B, Aroso J, Cumming SP. Characteristics of youth soccer players aged 13-15 years classified by skill level. Brit J Sports Med. 2007; 41:290-295.

Manchado C, Hoffmann E, Navarro F, Platen P. Beanspruchungsprofil im frauenhandball-belastungsdauer und herzfrequenzverhalten bei spielen der nationalmannschaft. Deutsche Zeitschrift Für Sportmedizin. 2007; 58(10):368-373.

Ohnjec K, Vuleta D, Milanović D, Gruić I. Performance indicators of teams at the 2003 world handball championship for women in Croatia. Kinesiology. 2008; 40(1):69-79.

Pokrajac B. EHF Men's Euro 2008-Analysis, discussion, comparison, tendencies in modern Handball., Publisher: EHF Web Periodical http://www.eurohandball.com/publications, visited, 2012.

Rogulj N. Differences in situation-related indicators of handball game in relation to the achieved competitive results of the teams at 1999 World Championship in Egypt. Kinesiology. 2000; 32(2):63-74.

Rogulj N, Srhoj V, Srhoj L. The contribution of collective attack tactics in differentiating handball score efficiency. Collegium Antropologicum. 2004; 28(2):739-746.

Rogulj N, Srhoj V. Influence of the collective attack tactics on handball match outcome. Fizička kultura. 2009; 37:15-20.

Sibila M, Vuleta D, Pori P. Position-related differences in volume and intensity of large-scale cyclic movements of male players in handball. Kinesiology. 2004; 36(1):58-68.

Spori G, Vuleta D, Vuleta D Jr., Milanov D. Fitness Profiling in Handball: Physical and Physiological Characteristics of Elite Players. Coll. Antropol. 2010, 34 (3):1009-1014.

Srhoj V, Rogulj N, Katić R. Influence of the attack end conduction on match result in handball. Collegium Antropologicum. 2001; 25(2):611-617.

Sotiriu R. Handbal antrenament, teorie-metodică. Bucureşti, 1998, 76-85.

Taborsky F. Cumulative indicators of team playing performance in handball (Olympic Games Tournaments 2008), Publisher: EHF Web Periodical http://www.eurohandball.com/publications, visited 2012.

Vuleta D, Milanović D, Sertić H. Povezanost varijabli šutiranja na gol s konačnim rezultatom rukometnih utakmica Europskog prvenstva 2000 godine za muškarce. Kinesiology. 2003; 35(2):168-183.

Zapartidis I, Skoufas D, Vareltzis I. Factors Influencing Ball Throwing Velocity. Open Sports Med. J. 2009; 3:39-43.

Ziv G, Lidor R. Physical characteristics, physiological attributes, and on-court performances of handball players: A review. European Journal of Sport Science. 2009; 9(6):375-386.

Visited Websites

(1) www. eurohandball.com visited 2012

(2) www.ehfTV.com visited 2012

Palestrica of the third millennium – Civilization and Sport
Vol. 13, no. 4, October-December 2012, 333–338

An analysis of the performantial defense behavior of the top three male handball teams in comparison to the Romanian team in the World Championships, Sweden, 2011

Analiza comportamentului performanţial al apărării, la nivelul primelor trei echipe de handbal masculin, comparativ cu echipa României, în cadrul Campionatului Mondial din Suedia, 2011

Elena Balint
Faculty of Physical Education and Mountain Sport, "Transylvania" University, Braşov

Abstract

Background. We started from the idea of the role that anticipation and decision making have in accomplishing motor actions in the defense of a handball game, identifying the effects of these mental processes and what determines their success or failure in a competitive game at a high scale confrontation (Olympic Games, World Championships etc.).

Aims. The analysis of the compartment's profile of defense and of some parameters recorded at the level of the first three teams from the general classification of men's handball World Championships Sweden 2011, to which the performance of the male national team of Romania is compared.

Methods. The comparative study was conducted on players components of the teams ranked in the first three places at the men's handball World Championships in Sweden 2011 and the Romanian team that occupied the 19th place in the competition. The results were statistically analyzed based on the outcomes obtained from the record sheets. Another method was synthesizing information resulting from the video recordings and viewed games sustained by the official teams of France, Spain, Denmark and Romania.

Results. The four parameters of defense were applied in 215 situations out of 838. The number of individual actions of defense was 177 and of collective actions 38. The experimental group recorded 71 individual actions and 14 collective actions while the control group cumulated 106.3 individual actions and 24.6 collective actions. 97.3 penalties were received by the two experimental groups with regard to the breaking of regulation.

Conclusions. The parameters of defense had a share of 26.3% out of 494.3 defensive within the control group and 24.7% defensive situations for the experimental group from a total of 344 such situations. Regarding individual tactics, the groups demonstrated close percentages - 21.5% the control group and 20.6% the experimental group; for applied collective tactic performances, the percentages were 4.9% for the control group and 4% for the experimental group. The cumulative sanctions for the two groups were 54.3 for the control group with an average of 5.43/game and 43 for the experimental group with an average of 6.14/game.

Keywords: high performance handball, defense, anticipation, efficiency, fair play.

Rezumat

Premize. S-a pornit de la ideea rolului pe care îl au anticiparea şi decizia de acţiune în realizarea actului/acţiunii motrice în apărarea jocului de handbal, identificarea efectelor acestor procese psihice şi ce anume le determină reuşita sau nereuşita lor într-un joc competiţional, la confruntare de mare anvergură (Jocuri Olimpice, Campionate Mondiale etc.).

Obiective. Analizarea modelului compartimentului de apărare şi a unora dintre parametrii înregistraţi la nivelul primelor trei echipe din clasamentul general al Campionatului mondial de handbal masculin Suedia 2011, la care este raportată prestaţia echipei naţionale masculine a României.

Metode. Studiul comparativ s-a desfăşurat pe loturile de jucători componenţi ai echipelor masculine de handbal clasate pe primele 3 locuri la Campionatul mondial din Suedia 2011 şi lotul României ocupantă a locului 19. Rezultatele au fost prelucrate statistic, pe baza rezultatelor obţinute din fişele de înregistrare aplicate. O altă metodă a fost sintetizarea informaţiilor rezultate în urma înregistrărilor şi vizionărilor video a jocurilor oficiale susţinute de echipele Franţei, Spaniei, Danemarcei şi României.

Rezultate. Cei patru parametri de apărare s-au aplicat în 215 de situaţii din totalul de 838. Acţiunile individuale de apărare au atins valorile de 177, iar cele colective de 38. Lotul experimental a înregistrat 71 acţiuni individuale şi 14 colective, în timp ce grupa de control a cumulat 106,3 acţiuni individuale şi 24,6 acţiuni colective. S-au primit 97,3 sancţiuni de către cele două

Received: 2012, October 5; *Accepted for publication:* 2012, November 22
Address for correspondence: Faculty of Physical Education and Mountain Sport, Transylvania University, Braşov, Colina Universităţii str. no.1, code 500068
E-mail: liabalint@yahoo.com

grupe experimentale pentru încălcarea regulamentului.

Concluzii. Parametrii de apărare au avut o pondere de 26,3% din totalul de 494,3 de situaţii defensive în care s-a aflat lotul de control şi de 24,7% pentru lotul experimental din totalul de 344 de astfel de situaţii. La tactică individuală loturile au ponderi apropiate - 21,5% lotul de control şi 20,6% lotul experimental; la tactica colectivă aplicată, performanţele sunt de 4,9% pentru lotul de control, 4% pentru lotul experimental. Sancţiunile aplicate cumulativ pentru cele două loturi au fost de 54,3 pentru lotul de control cu o medie de 5,43/meci şi 43 pentru lotul experimental cu o medie de 6,14/meci.

Cuvinte cheie: handbal de mare performanţă, apărare, anticipaţie, eficacitate, fair play.

Introduction

The accelerated growth of sports results at world level, an essential feature in the last period of time, causes changes in the most important areas of sports activities. The Olympic Games, World Championships, continental and national competitions always require high quality training in full accordance with the competition profile (Gutierrez et al., 2011; Marczinka et al., 2011; Massuça et al., 2011). This superior training can be achieved only through a scientific activity that replaces spontaneity and routine in determining the training process of the athlete, ensuring rigorous scientific foundation (Cartwright et al., 2005; Hianik et al., 2011).

High performance handball has reached nowadays a high development level and therefore, a more pronounced need to analyze all its scientific aspects appears. Its continuous development leads both theoreticians and practitioners to study and constantly update issues regarding the content of the competitive game which directs the training process. In this training process the accent falls increasingly on defense actions, some of them having great significance in the team game (Foret et al., 2011; Taborsky et al., 2011).

According to specialists, performance in sports represents the result obtained in a specific activity designated by a number or a value of the rating scale (Epuran et al., 2001).

In an more detailed approach, "sport performance designates both the process and the results of an action, which in legal terms represents the mastery in performing a task the best way possible, being dependent on the interrelation of the endogenous factors - predispositions, skills – with exogenous factors - ambiental - expressed in the quality of the training process, training material and conditions, the level of motivation and the influence of social factors "(Bompa, 2003; Dragnea & Mate-Teodorescu, 2002).

Viewed through the prism of sport activity performance, anticipation is an essential procedure for athletes, especially for those practising team sports, to deal with long delays of reaction (Bard & Bard, 2006). High performance athletes know what stimuli can act, in what place, they can predict when these will occur and which are the appropriate responses. The player can perform movements in advance by processing the information, which normally takes place during the stages of selection and response programming (Michalsik et al., 2011, Atkinson et al., 2002). This allows him to initiate movement much earlier or at the same time with the environment movements, or to feel where and how a ball blocked by the goalkeeper from the wing position throw, will land. Based on these predictive capabilities, high level players respond to stimuli depending on the reaction time processes (Rivilla et al., 2011; Prisacaru, 2011).

For many viewers the attack is similar to the match in progress, but for the team, "defense is ... work and players must submit along training pure and hard work" (Krimboltz, quoted by Constantini, 2002b). A good attack wins games and defense wins championships even though this section of the game is far from being attractive in sports training. Although we recognize the undeniable value of the winners of various competitions in collective games, especially in the handball game, we often indicate the objective value of the champion team, club team or national team in defense. Defense is the soul of winners and it is known that winning teams must be balanced to provide strong defense and efficient attack, but when the attack has problems they will always carry solid defense (Constantini, 2002b; Guillen, 2003).

Nowadays, defense actions have assumed a major role in the progress of a spectacular game and taking initiatives and risks incites players and draws the public through the significant number of advantages obtained through successful interventions. The main objectives of defense did not change and the primary goal is to prevent the opponent to score goals and at the same time the concern to take possession of the ball or in a more realistic concept to recover the ball without receiving a goal (Constantini, 2002; Prisăcaru, 2011).

This objective requires the defense to have some basic objectives and tasks that must be achieved as soon as possession of the ball is lost. Therefore, defenders either individually or together must oppose to the movements of the attackers and the ball passing or at least to create difficulties in receiving and handling the ball, thus creating favorable situations for its recovery, or challenging the opponent to commit mistakes. "To defend means to perform an active opposition, the action of preventing the opponent with the ball to enter easily and efficiently in his favorable areas in order to exploit an instant tactical situations" (Estriga et al., 2011; Sibila et al., 2011). This means that the defense must resist at all the game times in order to block as many throws as possible, obviously building zones clearly in danger.

Aims

- study of sources in the field of sports psychology with regard to the factors contributing to support motor performance;
- recording of the official games taking place in a major international confrontation;
- nomination of the measurable parameters in the defense compartment, determining the role of decision and anticipation in the handball game.

The aim was to find out some technical specifications about the teams of France, Denmark and Spain, knowing that they played along with Germany the best games of

the moment. At the World Championship held in 2011 in Sweden, the Romanian team performed lamentably, occupying the 19th position of 24 listed, which led us to analyze the evolution of the Romanian players in this competition.

Hypothesis

If a high-performance handball team has players with a high degree of intelligence and tactical thinking along with a well-built psychomotricity support, technical and tactical mastery but also competitive experience, perhaps at some time during its evolution, the team can position itself successfully in the top of the hierarchy in world competitions, achieving a game model based on rationality in action.

Material and methods

The research studied the behavior of players participating in the final of the 22nd Men's Handball World Championship that took place in Sweden from 13 to 30 January 2011, namely, the teams of France, Spain, Denmark and Romania (2).

Groups and subjects

- The experimental group was the Romanian team consisting of 18 male subjects, aged between 24-35 years.
- The control groups were considered the team of France, consisting of 18 male subjects, aged 24-36 years, the team of Spain including 16 male subjects aged 24-39 years, and the team of Denmark formed by 18 male subjects aged between 24-39 years.

Tests applied

We used the study of video games performed in order to highlight the capacity to anticipate the opponent's actions and decisions, based on his reaction to various collective and individual tactical maneuvers.

In order to carry out the analysis of the performance behavior and the playing pattern of the team players, the official games were recorded and then studied in detail regarding the problems and tasks of the study hypothesis.

For this, we used video and computer equipment with the help of which the behaviors were evaluated and the transcription of the teams was reflected by the data obtained in a recorded sheet summarized according to the statistics provided by the International Handball Federation (1, 3), comprising parameters related to defense in particular (Table I).

Statistical methods used

The data were processed statistically and mathematically using the significance of the differences between the means, uncorrelated samples, and descriptively and graphically interpreted using the Microsoft Excel application.

Table I

Model of the record sheet including the parameters of the defense compartment.

Parameters/Defense	France	Denmark	Spain	Romania
Interceptions	42	28	63	32
Blocked throws	49	44	27	28
Closing breakthroughs	21	19	26	11
Closing lanes of penetration	29	19	26	14
Sanctions	60	53	60	43

Results

Throughout the competition, 37 observation sheets of the games played by the teams of France, Spain, Denmark and Romania were recorded, centralized and analyzed. The statistical processing, the interpretation and graphic representation of the data revealed the importance of anticipation in the efficiency of defense for the first three teams over the 10 official games and the Romanian team only for 7 games (five games in the group and two games to position themselves in the overall standings, below the 10th place).

Some of the observed parameters were based on the capacity to anticipate the opponent's actions in attack situations that were recorded during the games that were played by the teams under study. The parameters of the defensive game expected to be recorded and analyzed are presented in Tables II, III and Figs. 1 and 2.

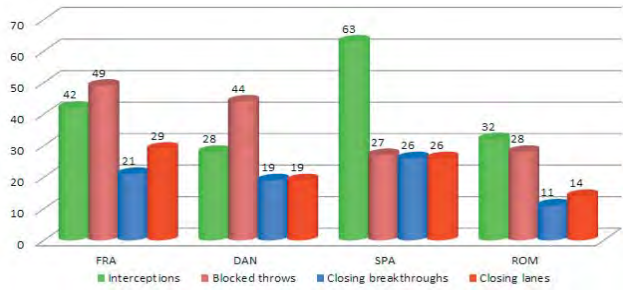


Fig. 1 – Expression of the effectiveness of individual actions in defense and technical faults made by the teams under study.

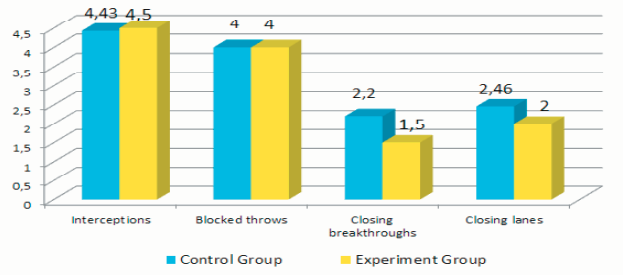


Fig. 2 – The graphical representation of the mean defense parameters in the experimental and control teams in Men's Handball World Championship in Sweden 2011.

Table II

Parameters resulting from the capacity of anticipation and decision making for defense performed by the teams of France, Denmark, Spain and Romania.

Group	Game parameters in defense and their efficiency								
	Team	Interceptions	%	Blocked throws	%	Closing breakthroughs	%	Closing lanes of penetration	%
Experimental	Romania	32/344*	9.3	28/344*	8.13	11/344*	3.19	14/344*	4.09
	France	42/485*	8.65	49/485*	10.1	21/485*	4.32	29/485*	5.97
Control	Denmark	28/515*	5.43	44/515*	8.54	19/515*	3.68	19/515*	3.68
	Spain	63/483*	13.04	27/483*	5.59	26/483*	5.38	26/483*	5.38

*Defense situations

Table III

Calculation of the significance regarding the difference between the means for the parameters of defense.

Group	The calculation of the statistic significance regarding the defense parameters						
	Total actions	Mean	D	S_D	$S_{\bar{D}}$	t-calculated	p
Experimental**	85	12.1	0.93	0.46	0.23	4.04	0.05
Control *	130	13.03					

*Teams of France, Spain and Denmark

**Team of Romania

The statistical processing of defense parameters revealed mean values for actions/game achievements in the experimental group of 12.1 and 13.03 and in the control group a deviation of the differences of 0.46 and a significance of the mean differences of 0.23. T is calculated at the limit of 0.05 and 4.04 and at f = n-1.

Another important parameter for the efficient evolution of the team is represented by the penalties that the players received during the sustained games. The intervention of the defender, uncertain, with slow and late movement, with a higher level of physical and mental fatigue, entails the players to commit deviations from the sport behavior resulting in fouls sanctioned according to the gravity of the offense. These are presented in Table IV and Figure 3.

Table IV

Penalties received in response to the regulation faults committed in defense by the teams of France, Denmark, Spain and Romania.

Team	Yellow card	2 min suspension	Red card	Total
France	29/10 games	31/10 games	0	60
Denmark	29/10 games	24/10 games	0	53
Spain	26/10 games	33/10 games	1	60
Romania	19/7 games	24/7 games	0	43

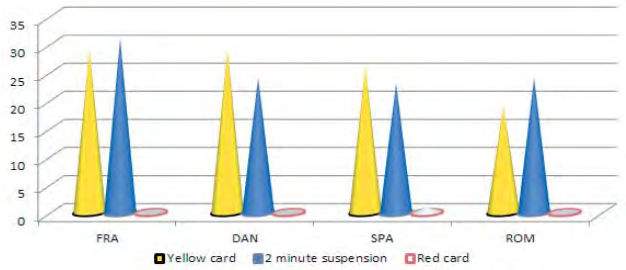


Fig. 3 – The graphic expression of the sanctions received in defense by the teams under study.

Discussion

The dynamic game developed by the timely and effective defense intervention of the defenders determined the raising of the percentage of the overall effectiveness of the game. From the analysis of the results of each parameter we can see that the achievement rate weighs in favor of individual actions with a total of 177, compared to 38 collective actions. Therefore, the control group had an average of individual defense actions of 13.03/game as opposed to the team of Romania that had an average of 10.14/game and the average of collective actions was 7.4 and 2/game, respectively. The goalkeepers of the studied teams had meritorious behavior, the values of efficiency ranging between 30% for the team of France, 36% for Spain, 24% and 36% for Romania and Denmark, increasing the team chances for a good classification.

In the control group, the French team had a number of 42 interceptions (8.65%), with most of them performed by BG-8 and NK-7, 49 blocked throws on goal (8.65%) with players NK-10, AW-10 and DD-16, closing lanes of penetration and breakthroughs with a total of 50 actions (10.3%). The team of Denmark in the 10 matches played recorded 28 interceptions (5.43%), 44 blocked balls (8.54%), and 38 individual and collective defense actions (7.36%). In the team of Spain we can observe that the interception parameter was performed 63 times (13.04%), with fewer blocked throws on goal, 27 (5.59%), and a total of 52 individual and collective actions to close the breakthroughs and lanes of penetration (10.76%).

The Romanian team under study as an experimental group had a number of 32 interceptions (9.3%), a higher percent than France and Denmark, a total of 28 blocked throws on goal (8.13%), and 25 individual and collective actions of closing breakthroughs and lanes of penetration (7.28%). In this segment of the game in defense, the differences between the values obtained by our team, ranked 19th, and the top three teams are relevant even if the Romanian team played only 7 games. However, the average of the individual and collective actions per game was 10.14 compared to the average of 13.03 actions performed by the control group.

The statistical indicators that were calculated reveal an advantage in favor of the control group, resulting in a t-calculated of 4.04 at a rate of 0.05 for f = n-1. This demonstrates that the hypothesis has been confirmed in a proportion of 99.95% and that the 1st, 2nd and 3rd positions in Men's Handball World Championship held by the teams of France, Spain and Denmark are not due to chance but to the capacity to anticipate, making efficient decisions, and an optimal mobilization of players in critical situations.

The smaller values obtained by the Romanian team in the defense compartment reveal the low physical training of the players, which leads to delayed reactivity and mobility in tracking the enemy.

Deficient mental training is another cause of low performance, which was expressed by a weak capacity for concentration and mental strength in front of a sustained attack rhythm imposed by the teams of France, Denmark and Spain, which had various quick and subtle ways of passing the ball and were very good players able to make the difference in all field areas.

Another weak point in our team's defense was the lack of reserve players to rise to the players from the first team or having the ability and willingness to work upon request.

The received disciplinary sanctions is another aspect of the techniques and tactics used in defense that reflect fairness in mastering defensive procedures and the specific physical training for a competition. Studying the sport behavior among teams who respected their opponents, we can observe that Romania ranked third regarding fair play in the World Championship with a total of 67 points (out of 7 games) Spain ranked fourth with 97 points, France sixth with 101 points, and Denmark ranked seventh with 103 points (the three teams having 10 official games). For calculating the points we used the formula: (Ex) x10 + (RC) x5 + (2min) x1 = total points (3; 4).

After analyzing the previous parameters, the control group had 173 penalties with an average of 17.3/game, most of which were made by the team of France - 60, of which 29 yellow cards and 31 2-minute suspensions, Spain 60 - game faults punished with 26 yellow cards, 33 2-minute suspensions and one red card for accumulation of 3 2-minute suspensions. The team of Denmark committed 53 penalties, including 29 yellow cards and 24 2-minute suspensions (an average of 5.3/game), Spain had 60 offenses, 26 sanctioned with yellow cards, 33 2-minute suspensions and a red card for accumulation of 3 2-minute suspensions. The Romanian team gathered in 7 matches played 43 sanctions as follows: 19 yellow warnings and 24 situations of elimination for 2 minutes (Tables III, IV, and Figure 2).

Regarding sanctions, the experimental group had an average of 6.14/game less than the average of the control group (17.3/game). Individual analysis shows that the experimental group had a higher percentage of sanctions in the 7 games played (6.14) compared to each component of the control group, namely Denmark (5.3/game), France and Spain (6/game). These values reveal several causes underlying the obtaining of these sanctions by the Romanian players, which can be technical, physical - insufficient training, the lack or minimization of the importance of psychological training for competition, apathy, indifference, moral collapse, desperate situations.

Conclusions

1. The defense parameters studied were applied by both groups in 215 out of 838 defense situations, with a percentage of 25.6% of the total defense means that the high performance player possesses.

2. For the control group, individual actions were used in 106.3 out of 494 defense cases, representing 21.5%, while collective actions were used 24.6 times, with a rate of 4.8%. Therefore, the following statistics were obtained from 10 official matches: a number of 44.3 interceptions with a rate of 41.6%, 40 blocked throws with a percentage of 37.6%, closing the breakthroughs 22 times with a success rate of 23.1%. The experimental group had 344 defense situations in which players applied 85 defensive tactics: 71 individual and 14 collective. Out of the individual actions, interception was performed 32 times (37.6%), blocked balls 28 times (32%), and closing breakthroughs 11 times (12.9%).

3. Although defense parameters had an efficiency of application of 26.3% out of the total number of defense situations in the control group and 24.7% of the 344 such cases for the experimental group, the differences between the average values are not important and cannot be explained in terms of the low development of the team and its ranking on the 19th place. For a full and correct analysis, the attack compartment, the efficiency of players in the field positions and the overall effectiveness of the game in attack must be explored. Deficiencies in the physical training of the defenders underlay the application of individual actions in defense, the decisions made by the defenders in the opposing attack. Interceptions and blocked throws on goal require a high level of intuition and anticipation of what one's opponent is planning to do and our team achieved an average for a global competition.

4. The game offenses and penalties applied cumulatively for the two groups were 54.3 for the control group with an average of 5.43/game, and 43 for the experimental group with an average of 6.14/game.

Practical and methodological recommendations

1. Coaches, people responsible for the training of national teams should aim to keep up to date with the latest specialized studies in the field, which are currently published in journals of education in the country and abroad.

2. Without a high level of technical skills, the established objectives cannot be successfully attained through the tactical plan of the game. This is why an important point in training should be the continuous raising of the performance level of the technical content.

3. The problematization of training is also a goal to pursue. Tactical preparation should be part of training, with the aim of ensuring multiple ways to solve a game task in direct confrontation with the opponent.

Conflicts of interests
Nothing to declare.

References

Atkinson RL. Atkinson RC, Smith EE, Bem DJ. Introducere in psihologie. Ed. Tehnică. Bucureşti, 2002.

Bard SA, Bard MG. Să înţelegem creierul. Ed. Curtea Veche. Bucureşti, 2006

Bompa OT. Performanţă în jocurile sportive. Ed. ExPonto SNA. Bucureşti, 2003, 63

Cartwright AL, Pitney AW. Fundamentals of Athletic Trening. Sec. Ed. Human Kinetics, Champaign. Illinnois, 2005

Constantini D. New elements in the attack in mens Handball at the Olyimpic Games. EHF periodical. 2002a; 1:36-38

Constantini D. The use of anticipation in defence as a tool to organise counterattacks. EHF periodical. 2002b; 2:43-47

Dragnea A, Mate-Teodorescu S. Teoria Sportului. Ed. FEST. Bucureşti, 2002

Epuran M, Holdevici I, Toniţa F. Psihologia sportului de performanţă. Ed. FEST Bucureşti. 2001,117-175; 271-290

Estriga ML, Costa JM, Melo Al. Fazendeiro BP. Decision making in Portuguese handball referees. Scientific conference, Vienna 18-19 November 2011, 37-41

Foretic N, Rogulj N, Srhoj V, Burger A, Rakovic K. Differences in situation efficiency parameters between top men and women handball teams. EHF Scientific Conference Vienna, 18-19 November, 2011, 243-247

Gutierrez AO, Ruiz Gomez JL, Ramis J. Claverusing DEA

to assess the efficiency of handball teams, EHF Scientific Conference, Vienna 18-19 November 2011, 248-251

Guillen GF. Introduccion a la psicopedagogia de la Actividad Fisica y el Deporte. Col. Psicologia del Deporte. Ed. Kinesis, Lisabona, 2003

Hianik J. The team match performance indicators and their evaluation in handball. EHF Scientific Conference, Vienna 18-19 November, 2011, 252-256

Massuça LM. Expertise evaluation of technical and tactical proficiency in handball: differences between playing status, EHF Scientific Conference, Vienna 18-19 November 2011, 282-286

Marczinka.Z. What's the difference?-coaching female and male handball players. EHF Scientific Conference, Vienna 18-19 November 2011, 89-93

Michalsik LB, Aagaard P, Madsen K. Match performance and physiological capacity of male elite team handball players. EHF Scientific Conference, Vienna 18-19 November 2011, 168-173

Prisacaru RI. Analysis of tactics and offensive play systems in the European elite teams in order to optimize the attack of the Romanian „top" teams - men's handball. EHF Scientific Conference, Vienna 18 -19 November 2011, 308- 313

Rivilla J, Lorenzo J, Ferro A, Sampedro J. Effect of the decision making process in the speed of defensive displacement in handball. EHF Scientific Conference, Vienna 18-19 November 2011, 101-103

Šibila M, Bon M, Uroš M, Pori P. Differences in certain typical performance indicators at five consecutive men's European handball championships held in 2002, 2004, 2006, 2008 and 2010. EHF Scientific Conference, Vienna 18-19 November 2011, 319-324

Taborsky F. Phenomenon Handball, Scientific conference, Vienna 18-19 November 2011, 7-13

Websites visited

(1) http://www.olympic.org visited on 23.08.2012.
(2) www://ehf.com visited on 27.09.2012
(3) www://ihf.statistics.com visited on 23.08.2012
(4) www://frh.ro visited on 27.09.2012

Palestrica of the third millennium – Civilization and Sport
Vol. 13, no. 4, October-December 2012, 339–347

The relationship between sports and polyphenols: a retrospective analysis of PubMed publications over the last 52 years

Relaţia dintre sport şi polifenoli. O analiză retrospectivă a publicaţiilor PubMed din ultimii 52 ani

Ramona Jurcău
"Iuliu Haţieganu" University of Medicine and Pharmacy, Cluj-Napoca

Abstract

Background. Sport (S) and polyphenols (P) represent subjects of research interest, but the relationship between them has been seldom investigated.

Aims. The purpose of the present paper is the evaluation of research concerning the S-P relationship, by the retrospective analysis of PubMed publications over the past 52 years.

Methods. The relationship between S and P was evaluated over two segments of time. A) The 1960-2012 period, where the following were considered: a) the key words "S and P"; b) each year of 1960-2012; c) some of the filters for selection of information provided by the PubMed site, B) The recent period, 2010-2012, where the following were considered: a) the key words "S", "P", "S and P"; b) some types of P; c) each type of P analyzed in combination with the key word S. Statistical evaluation was made on the basis of the Student test.

Results. There are significant differences between the means over 52 years: for the total number (T) of publications, abstracts and full text compared each of them to free full text (FFT); between age groups 19-44 and 65-plus, 19-plus and 45-64, and 19-plus and 65-plus; English and other languages; Journal article (JA) - Randomised controlled trial. In the years 2010-2012, the number of publications for "S" and for "P" is significantly increased compared to that for "S" and "P"; the number for each type of P is higher than for S and every type of analyzed P.

Conclusions. 1) The total number of publications over 52 years is low, 35. 2) The number of FFT is reduced compared with T, which could be an impediment to consult the details for those with modest financial possibilities, but the language of publication of the summaries being English, the access to reliable information is greatly facilitated. 3) The studies in human subjects were the favorites, especially men, mostly aged between 19-44 years. 4) The type of publication the most commonly chosen, of the selected item, was JA. 5) Studies on "S AND P" are diversified across several types of P and out of 17 studies for the years 2010-2012, 16 have favorable conclusions for the use of P in S. 6) The relationship between S and P, although summarily represented numerically, is important through the individual value of S and P, as well as the increasing interest by opening up their use in research related to S.

Keywords: sports, polyphenols, types of polyphenols, PubMed filters.

Rezumat

Premize. Sportul (S) şi polifenolii (P) reprezintă subiecte de cercetare de interes, dar relaţia S-P este modest investigată.

Obiective. Scopul lucrării prezente îl constituie evaluarea preocupărilor de cercetare pentru relaţia S-P, prin analiza retrospectivă a publicaţiilor PubMed din ultimii 52 de ani.

Metode. Relaţia S-P a fost analizată pe două segmente de timp. A) Perioada 1960-2012, fiind evaluate: a) cuvintele cheie "S şi P"; b) fiecare an din 1960-2012; c) câteva dintre filtrele PubMed. B) Perioada 2010-2012, fiind evaluate: a) cuvintele cheie „S", „P", „S şi P"; b) câteva tipuri de P; c) fiecare tip analizat de P în combinaţie cu S. Evaluarea statistică s-a făcut pe baza testului Student.

Rezultate. Există diferenţe semnificative între mediile pe 52 ani: pentru numărul total de publicaţii (T), respectiv de abstracte şi de text integral, comparativ cu cel cu text integral gratuit (TIG); între vârstele 19-44 şi 65-plus, 19-plus şi 45-64, 19-plus şi 65-plus; între limba engleză şi alte limbi; între Articol de Journal (AJ) - Randomised controlled trial. În 2010-2012, numărul de publicaţii pentru „S" şi „P" este semnificativ crescut, comparativ cu cel pentru „S şi P"; numărul pentru fiecare „tip de P" este mai mare decât pentru „S şi fiecare tip de P".

Concluzii. 1) Numărul total de publicaţii pe 52 de ani este redus, 35. 2) Numărul de publicaţii cu TIG, este redus comparativ cu T, ceea ce ar putea fi un impediment pentru consultarea detaliilor de către cei cu posibilităţi financiare modeste, dar, limba de publicare a rezumatelor fiind engleza, accesul la informaţia sumară este facilitat. 3) Au fost preferate studiile cu subiecţi umani, bărbaţi, între 19-44 ani. 4) Tipul de publicaţie cel mai frecvent ales, dintre cele selectate, este AJ. 5) Studiile pentru „S

Received: 2012, September 24; *Accepted for publication:* 2012, October 27
Address for correspondence: "Iuliu Haţieganu" University of Medicine and Pharmacy Cluj-Napoca 400012, Victor Babes Str. no. 8
E-mail: ramona_mj@yahoo.com

şi P" sunt diversificate pe mai multe tipuri ale P, din 17 pentru 2010-2012, 16 au concluzii favorabile utilizării P în S. 6) Relaţia S-P, deşi sumar reprezentată numeric, este importantă prin valoarea individuală a S şi P, dar şi prin deschiderea interesului acordat utilizării P în S.

Cuvinte cheie: sport, polifenoli, tipuri de polifenoli, filtre PubMed.

Introduction

Phytochemicals act as a defense system against diseases. They are natural bioactive compounds found in fruits, vegetables, aromatic and medicinal plants, flowers, leaves and roots (Vasanthi et al., 2012). Plant polyphenols have antiinflammatory, immunomodulatory and antioxidant effects (Bao et al., 2012). It has been proven that the antioxidant supplement offers protection against exercise-induced oxidative stress (Morillas-Ruiz et al., 2006). For their beneficial effects, polyphenols have been intensively studied in recent years (Mar et al., 2012), particulary those derived from green tea, termed green tea polyphenols (GTP) (Khan & Mukhtar, 2012). The relationship between polyphenols and sport has been investigated, but much less compared to other topics related to the subject of polyphenols. Thus, a recent study has demonstrated that caffeic acid stimulates skeletal muscle AMPK activity and insulin-independent glucose transport with a reduction of the intracellular energy status (Tsuda et al., 2012). Lengthening contraction-induced muscle injury is protected by apple polyphenols (APPs) (Nakazato et al., 2012). Regarding green tea extract (GTE) as a source of energy in skeletal muscle during exercise, increased metabolic capacity and utilization of fatty acid partly mediate its endurance-improving effects (Murase et al., 2012).

Hypothesis

Polyphenols are a topic of increasing interest in interdisciplinary research over recent years. Sport, in its turn, is a research topic of high interest. However, the relationship between the two subjects has been little investigated so far.

Objectives

The purpose of the present paper is the evaluation of research concerning the relationship between sport and polyphenols, by the retrospective analysis of PubMed publications over the past 52 years.

Material and methods

A. Analysis of 52 years, 1960-2012

The relationship between sport and polyphenols was carried out using three elements of analysis:

- key words "sport and polyphenols";
- each year of the period 1960-2012;
- some of the filters to check information provided by PubMed, whose names were those mentioned by the site, namely: *Text availability*, *Species*, *Sex*, *Ages*, *Languages*, *Article types*, each of these filters forming a study group.

Within each selected check filter, some subfilters were analyzed, and for each of them the number of publications per year was calculated, using the mentioned key words.

- For group filter *Text availability*, the chosen subfilters were: the total number of publications (T), the abstract number (AB), the number of publications with full text (FT) and free full text (FFT).
- For group filter Species, the chosen subfilters were: other animals (AN) and humans (H).
- For group filter Sex, the chosen subfilters were: Male (M), Female (F), Male and Female (MF).
- For group filter Ages, the chosen subfilters were: 0–18, 19–plus, 19-44, 45-64, 65-plus, 80-plus.
- For group filter *Languages*, the chosen subfilters were: English (E) and all the other languages (AL).
- For group filter *Article types*, the chosen subfilters were: Journal article (JA), Clinical trial (CT), Randomised controlled trial (RCT).

B. Analysis of the recent period 2010-2012

The relationship between sport and polyphenols was carried out using three elements of analysis:

- key words "sport" (S), "polyphenols" (P), "sport AND polyphenols" (S+P), "(some type of) polyphenols" and "sport AND (some type of) polyphenols";
- each year of the period 2010-2012;
- the polyphenols in the enter search box: Dietary (DT), Cocoa (CP), Coffee (CFP), Apple (AP), Grapes (GP), Plant (PP), Tea (TP), Green Tea (GTP).

Statistical evaluation was made on the basis of the Student's t-test.

Results

Data were collected in November 2012. For all groups, data distribution was normal, according to the Kolmogorov-Smirnov test. The analysis was performed on the chosen time periods.

A. Analysis of 52 years, 1960-2012

Analysis of the number of publications with the *Text availability* filter (Table I, Fig. 1). The total number of publications over the 52 years was 35 (T), followed by AB (33), representing 94% of T. The 52 year averages

Table I

Analysis of the number of publications with the *Text availability* filter.

Subfilter	Arithmetic mean	Standard deviation	p	Total number of publications (T)/52 years	% of T
Total (T)	3.1818	2.4827	0.004	35	100
Free full text (FFT)	0.6364	0.809		7	20
Abstract (AB)	3	2.5584	0.006	33	94
Free full text (FFT)	0.6333	0.7715		7	20
Full text (FT)	2.9083	2.5029	0.007	32	91
Free full text (FFT)	0.6333	0.7715		7	20

presented significant differences between T-FFT (p = 0.004), AB-FFT (p = 0.006), FT-FFT (p = 0.007). The dynamic analysis of the number of publications over the 52 years proves that T, AB and FT began to grow in the years 1989, 1990. Between 1991-2005 there were no publications, their number increased in subsequent years with a maximum value in 2010, and slightly decreased over the past two years. In 2012, FT was reduced compared to AB, but insignificantly.

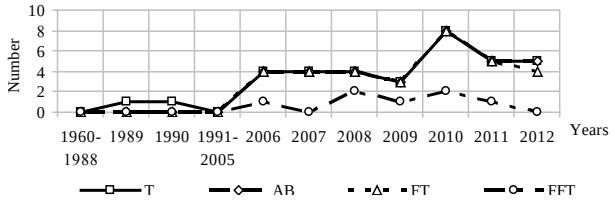


Fig. 1 – Dynamic analysis of the number of publications with the *Text availability* filter.

Analysis of the number of publications with the *Species* filter (Table II, Fig. 2). The total number of publications over the 52 years was the highest for H (21), representing 60% of T. Between the average number of publications for animal (AN) and human (H) there were no significant differences. There were no AN studies for the years 1960-1988 and 1990-2005 and no H studies for the years 1960-1989 and 1991-2005. The largest number of AN publications was in 2010 and of H publications in 2010-2011. Although insignificant, the greatest difference between the number of AN and H publications was found in 2011.

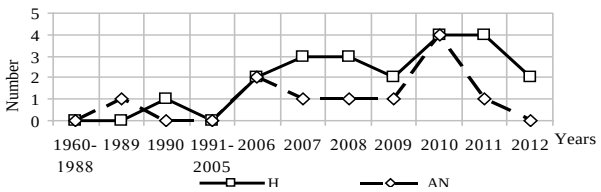


Fig. 2 – Dynamic analysis of the number of publications with the *Species* filter.

Analysis of the number of publications with the *Sex* filter (Table III, Fig. 3). The total number of publications over the 52 years was the highest for M+F (22), representing 62% of T. There were no significant differences between the average number of publications for male (M), female (F) and male and female (MF). The subjects' gender was not mentioned at all in studies over the years 1989 and 1990. The number of publications with M was greater compared to F in 2006-2008, 2010, 2011, but the differences were not significant. Although insignificant, the greatest difference between the number of publications with M and F was recorded in 2006.

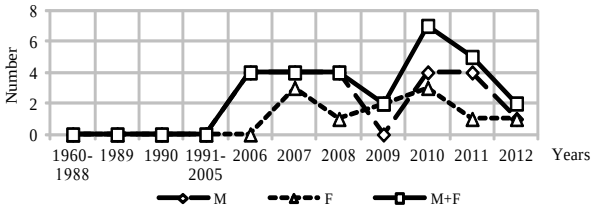


Fig. 3 – Dynamic analysis of the number of publications with the *Sex* filter.

Table II

Analysis of the number of publications with the *Species* filter.

Subfilter	Arithmetic mean	Standard deviation	p	Total number of publications (T)/52 years	% of T
Human (H)	1.9091	1.5136	ns	21	60
Animal (AN)	1	1.1832		11	31

Table III

Analysis of the number of publications with the *Sex* filter.

Subfilter	Arithmetic mean	Standard deviation	p	Total number of publications (T)/52 years	% of T
Male (M),	1.9091	2.0226		21	60
Female (F)	1	1.1832	ns	11	31
Male (M) + Female (F)	2	2.569		22	62

Table IV

Analysis of the number of publications with the *Ages* filter.

Subfilter	Arithmetic mean	Standard deviation	p	Total number of publications (T)/52 years	% of T
19-44	1.0909	1.0445	ns	12	34
45-64	0.5455	0.6876		6	18
19-44	1.0909	1.0445	0.04	12	34
65-plus	0.4545	0.5222		5	14
19-plus	1.6364	1.3618	0.04	18	51
45-64	0.5455	0.6876		6	18
19-plus	1.6364	1.3618	0.006	18	51
65-plus	0.4545	0.5222		5	14

Analysis of the number of publications with the *Ages* filter (Table IV, Fig. 4). The total number of publications over the 52 years was the highest for the 19-plus age group (18), representing 51% of T. There were no significant differences between the 19-44 and 45-64 age groups. In contrast, there were significant differences between 20-44 and 65-plus (p=0.04), 19-plus and 45-64 (p=0.04), 19-plus and 65-plus (p=0.006) age groups. There were no studies at all for the 0-18 and 80-plus age groups between 1960-2012; for the 44-64 and 65-plus age groups between 1960-2007; and for the 19-44 age group in 2009. For the study published in 1989, the age group used is not mentioned in the filter. The most numerous are the studies for the 19-plus age group. The greatest differences were recorded in 2011, between 19-plus and 44-65, and 65-plus age groups, respectively.

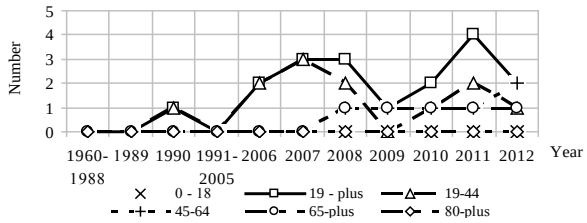


Fig. 4 – Dynamic analysis of the number of publications with the *Ages* filter.

Analysis of the number of publications with the *Languages* filter (Table V, Fig. 5). The total number of publications over the 52 years was the highest for E (33), representing 94% of T. There were significant differences between E and AL (p=0.003). The only language publication other than English was Russian, with one article published only in this language in 1989 and one article in 1990. The year with the most numerous mentions of English as a subfilter is 2010.

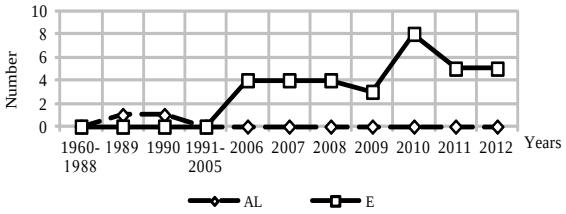


Fig. 5 – Dynamic analysis of the number of publications with the *Languages* filter.

Analysis of the number of publications with the *Article types* filter (Table VI, Fig. 6). The total number of publications over the 52 years was the highest for JA (32), representing 91% of T. There were no significant differences between JA-CT and CT-RCT. The JA-RCT difference was significant (p=0.05). By comparing the three subfilters, most of the publications were mentioned as JA, followed in descending order by CT, and RCT. The greatest difference between the number of publications was found for 2010, between JA-RCT (p=0.05), as well as between CT-RCT. In 2012, the number of publications with JA, CT and RCT subfilters was equal.

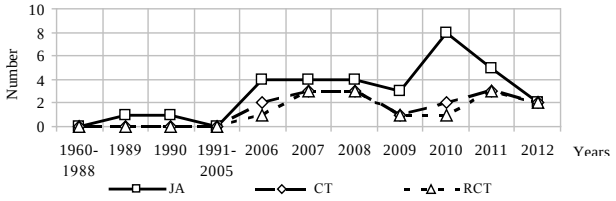


Fig. 6 – Dynamic analysis of the number of publications with the *Article types* filter.

B. Analysis of the recent period 2010-2012

For each year of the period 2010-2012, most of the publications were: in 2010, for S+P; in 2011, for S and for P. The highest total number of publications (TN) during the reporting period 2010-2012 was found for S (30725) (Table VII). TN for P and S+P was 10.2% and 0.6%, respectively, of S (Fig. 7).

Table V

Analysis of the number of publications with the *Languages* filter.

Subfilter	Arithmetic mean	Standard deviation	p	Total number of publications (T)/52 years	% of T
Russian (AL)	0.1818	0.4045	0.003	2	5.8
English (E)	3	2.6833		33	94

Table VI

Analysis of the number of publications with the *Article types* filter.

Subfilter	Arithmetic mean	Standard deviation	p	Total number of publications (T)/52 years	% of T
Journal article (JA)	2.9091	2.4271	ns	32	91
Clinical trial (CT)	1.4545	1.2933		16	46
Clinical trial (CT)	1.4545	1.2933	ns	16	46
Randomised controlled trial (RCT)	1.2727	1.2721		14	40
Journal article (JA)	2.9091	2.4271	0.05	32	91
Randomised controlled trial (RCT)	2.9091	2.4271		14	40

Table VII
Analysis of the number of publications during the 2010-2012 period.

Years	S	P	S+P
2010	10521	1011	8
2011	11255	1108	5
2012	8949	1024	5
TN (2010 + 2011 + 2012)	30725	3143	18

Legend: key words ”sport” (S), ”polyphenols” (P), ”sport AND polyphenols”(S+P).

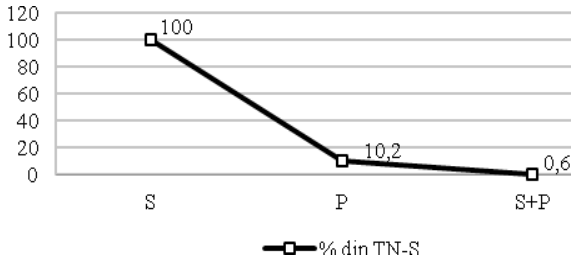


Fig. 7 – Analysis of % of TN-S for the number of publications during the 2010-2012 period, having as key words S, P and S+P.

For each year of the period 2010-2012, most of the publications were: in 2010, for CP; in 2011, for DP, AP, GP, PP, TP and GTP (Table VIII). Of the types of polyphenols shown in the search, the highest number was found for ”plant polyphenols” (1738), representing 55% of TN-P, and the lowest for ”coffee polyphenols”, representing 1.8% of TN-P (Fig. 8).

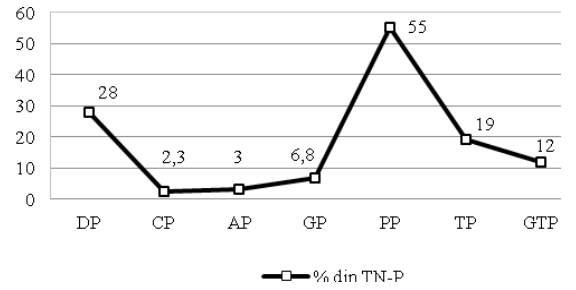


Fig. 8 – Analysis of % of TN-P for the number of publications during the 2010-2012 period, having as key words DP, CP, AP, GP, TP, GTP.

For each year of the period 2010-2012, most of the publications were: in 2010, for S+DP, S+AP and S+PP; in 2011, for S+CP and S+TP (Table IX). For the combination of ”sport AND (some kind of) polyphenol”, TN was the highest for ”sport AND plant polyphenols” (12), accounting for 66% of S+P , and the lowest for “sport AND cocoa polyphenols”, “sport AND coffee polyphenols” and “sport AND apple polyphenols”, representing 5.5% of S+P (Fig. 9).

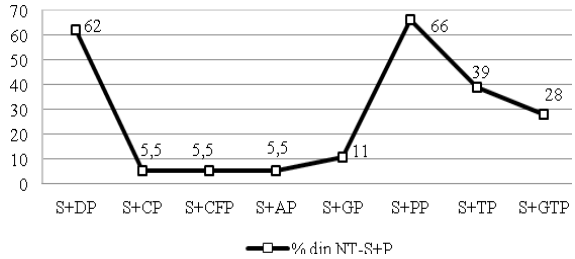


Fig. 9 – Analysis of % of TN-P for the number of publications during the 2010-2012 period, having as key words S+DP, S+CP, S+CFP, S+AP, S+GP, S+TP, S+GTP.

A comparative analysis of the three years, 2010-2012, with regard to the publishing details and the findings relating to the use of P, provides some information (Table X). One of the articles was mentioned twice (Jówko et al.), so the total number is not 18, the display of the search, but 17. Of the 17 studies, only one has an unfavorable result. All studies are published in journals with an impact factor higher than 1.9, values ranging between 1.974 (Nutr Res.) and 7.036 (Environ Health Prev Med). In five cases, the first author was found in 2 abstracts: Andersson et al., Jówko et al., Ogasawara et al., Sakurai et al., Shen et al.

Discussion

Rationale for subfilters

Group filter *Text availability*. The rationale for the T, AB, FT, FFT subfilters choice is that the information choosing steps start with the title of the publication, continue with the reading of the summary, and then, depending on

Table VIII
Analysis of the number of publications during the 2010-2012 period.

Years	DP	CP	CFP	AP	GP	PP	TP	GTP
2011	289	26	15	32	62	601	197	128
2011	309	23	16	40	80	680	212	133
2012	289	24	27	21	73	457	175	101
TN (2010 + 2011 + 2012)	887	73	58	93	215	1738	584	362

Legend: key words ”dietary polyphenols” (DP), ”cocoa polyphenols” (CP), ”apple polyphenols”(AP), ”grapes polyphenols” (GP), ”plant polyphenols” (PP), ”tea polyphenols” (TP), ”green tea polyphenols” (GTP).

Table IX
Analysis of the number of publications during the 2010-2012 period.

Years	S+DP	S+CP	S+CFP	S+AP	S+GP	S+PP	S+TP	S+GTP
2010	6	0	0	1	1	6	2	1
2011	3	1	0	0	1	5	3	2
2012	2	0	1	0	0	1	2	2
TN (2010 + 2011 + 2012)	11	1	1	1	2	12	7	5

Legend: key words ”sport AND dietary polyphenols” (S+DP), ”sport AND cocoa polyphenols” (S+CP), ”sport AND coffee polyphenols” (S+CFP), ”sport AND apple polyphenols”(S+AP), ”sport AND grapes polyphenols” (S+GP), ”sport AND tea polyphenols” (S+TP), ”sport AND green tea polyphenols” (S+GTP).

Table X

Comparative analysis of 2010-2012, with regard to the publishing details and the findings relating to the use of P.

Year and month of publication	Journal	Journal impact factor 2011	P type referred to as key word	Conclusion Favorable (F) Unfavorable (UF)	Authors
2012 Dec	Int J Sport Nutr Exerc Metab	2.01	GTP, TP	UF	Jówko et al.
2012 Nov	J Nutr Biochem	3.891	Cofee P	F	Tsuda et al.
2012 Sep	Environ Health Prev Med	7.036	DT	F	Sakurai et al.
2012 Jul	Phytomedicine	3.268	PP	F	Ulrich-Merzenich et al.
2012 May	Osteoporos Int	4.58	GTP, TP, DT, PP	F	Shen et al.
2012 Jan	Med Sci Sports Exerc	4.431	Non-alcoholic beer (NAB), DP	F	Scherr et al.
2011 Sep	Clinics (Sao Paulo)	2.058	GP, DP, PP	F	Gonçalves et al.
2011 Nov	Nutr Res	1.974	GTP, TP, DP, PP	F	Jówko et al.
2011 Apr	Int J Sport Nutr Exerc Metab	2.01	CP, PP	F	Allgrove et al.
2011 Mar	Phytother Res	2.086	GPT, TP, Oligonol = lychee fruit-derived, PP	F	Ogasawara et al.
2010 Dec	BMC Complement Altern Med	2.241	GTP, TP, DP, PP	F	Shen et al.
2010 Dec	J Appl Physiol	3.753	Purple sweet potato leaves (PSPL), DP, PP	F	Chang et al.
2010 Nov	Biochem Biophys Res Commun	2.484	Oligonol = lychee fruit-derived, DP	F	Ogasawara et al.
2010 Nov	Br J Nutr	3.013	DP	F	Andersson et al.
2010 Aug	Scand J Med Sci Sport	3.867	DP	F	Andersson et al.
2010 Mar	Mol Nutr Food Res	4.301	AP, DP, PP	F	Nakazato et al.
2010 Jan	J Nutr Biochem	3.891	GP, DP, PP	F	Sakurai et al.

interest, with the full text. There are publications that are not accompanied by an abstract, especially in the early years of the PubMed website. In addition, most publications allow for full text purchase, and this is a difficulty for those who would like to be informed but have modest financial possibilities. For them, free full text publications are a real help.

Group filter *Species.* The rationale for subfilters AN and H starts from the idea that the studies referring to polyphenols and sports are both clinical and experimental. The choice of one or other of these subfilters is useful in selecting studies.

Group filter *Sex*. The rationale for M, F, MF subfilters is based on the fact that there may be sex differences in the results of studies on polyphenols and sport. Some of these studies include in the analyzed groups only one gender, other studies, both genders.

Group filter *Ages.* The rationale for filters 0-18, 19-plus, 19-44, 45-64, 65-80 is related to finding that the body's reactions differ from an age group to another. This study shows that, for the chosen key words, there are no publications that contain extreme age groups, i.e. 0-18 and over 80.

Group filter *Languages.* The rationale for subfilters E and AL has as a motivation the fact that although English is the language used for abstracts, the language of the full text publication can sometimes be the native author's language. This is good to know when someone wants to consult full text articles, especially those that are free.

Group filter *Article types.* The rationale for subfilters JA, CT and RCT is that these types of publications have proved to be among the most frequently used publishing options.

Intra-group analysis

Group filter *Text availability*. The dynamic evolution of T, AB and FT proves that between 1960-2005, i.e. for 45 years, studies on "sport and polyphenols" were very few, including only one article in 1989 and another one in 1990. The interest in this subject began to grow in 2005-2006, the number of publications amounting to four per year in the years 2006, 2007, 2008. Over 52 years, the maximum number of publications per year was eight, in 2010. In the past two years it reached five publications per year, with these key words. Of these publications, for 45 years, between 1960-2005, in 2007 and 2012, FFT were non-existent. In the years 2008 and 2010, there were two FFT for each year, for these key words.

Group filter *Species*. The dynamic evolution of AN and H proves that between 1960-2005, i.e. for 45 years, studies on "sport and polyphenols" were very few, including one article for AN in 1989 and another one for H, in 1990. In 2006 and 2010, the number of publications was equal for AN and H, two for each year. Starting with 2007, the number of publications on human subjects was permanently higher compared to those on animal subjects. In 2012, there were no animal studies until the time of the collection of PubMed data. These findings show that regarding the "sport and polyphenols" subject, clinical trials were preferred.

Group filter *Sex*. The dynamic evolution of M, F and MF proves that between 1960-2005, i.e. for 45 years, there were no mentions of these subfilters in studies on "sport and polyphenols". Studies on the selected key words began to mention these filters in 2006, and since then, with the exception of 2009, the studies that included M outnumbered the ones that included F. In 2006, the number of the studies was four, containing only M, and in 2009, their number was two, containing only F. We notice that in the case of studies that have "sport and polyphenols" as key words, M subjects were preferred.

Group filter *Ages.* The dynamic evolution of the selected age groups as subfilters proves that between 1960-2005, i.e. for 45 years, studies on "sport and polyphenols" were very few, only two articles being published in 1989, one for the 19-plus and the other one for the 19-44 age group. However, considering that the first subfilter includes the second one, there is actually a single publication. The years 2007, 2008 and 2011 were those that mentioned the subfilters most frequently, three studies for each year. In 2012, until the time of the collection of Pubmed data, there was one published study with respondents aged between 18-44 years, one study for the 65-plus age group and two

studies for the 45-64 age group. The most frequent age range of studies on this topic was 19-44. As a result, we might make some assumptions: within this age range, sport is more frequently practiced; the use of polyphenols is the most necessary or the most effective or with the most well-defined results during this period of life; in this age group, study cooperation is optimal.

Group filter *Languages.* The dynamic evolution of E and AL proves that between 1960-2005, i.e. for 45 years, studies on "sport and polyphenols" were very few, only one article being published in 1989 and another one in 1990, both in Russian. Since 2004, the language of the publication began to appear as the filter, the only subfilter being English. We can deduce that, at least at the beginning, the studies with the key words "sport and polyphenols" were conducted by Russian researchers. The use of English in most publications can be justified by the need for an international language, to facilitate access to information.

Group filter *Article types*. The dynamic evolution of JA, CT and RCT proves that between 1960-2005, i.e. for 45 years, studies on "sport and polyphenols" were very few, one article being published in 1989 and another one in 1990, both for JA. Of the selected subfilters, the most frequently mentioned one was JA, with an equal number of publications in 2006, 2007 and 2008, four each year, and a maximum number in 2010, amounting to eight. CT and RCT mentions were permanently fewer compared to JA. It can be inferred that at least among the three analyzed subfilters, JA is the most used form of publication.

The recent period 2010-2012

The multiple beneficial effects of different types of polyphenols, supported by numerous studies, represent a starting point for their use in the field of sport.

The present study shows a large number of publications that match the search key words "sport" (TN=30725) and "polyphenols" (TN=3143), proving the interest in these two research topics, at least for the last three years. The appropriate search for the group of two terms "sport AND polyphenols" shows a greatly reduced number of publications (TN=17) compared with S and P. This situation could be explained by the fact that the studies concerning the use of polyphenols in sport could still be in their infancy. To support this hypothesis, there are 18 studies with S + P, of which only one has unfavourable conclusions.

We cite, in short, the findings of studies on S+P, grouped by types of polyphenols mentioned in the abstract.

Dietary polyphenols

"Exercise training as well as intake of *supplements*, such as polyphenols, is one strategy for this, because this regimen can result in reduction of WAT (White adipose tissue) mass, which affects the expression and secretory response of adipokines" (Sakurai et al., 2012). "WB (*standardized willow bark preparation*) (30 mg/kg), its ethanolic fraction rich in salicyl alcohol derivatives (FR-D) (30 mg/kg) and imipramine, by being effective in the FST (forced swimming test), modulated known and new targets relevant for neuro- and immunofunctions in rats" (Ulrich-Merzenich et al., 2012). "Intermittent exercise in well-trained female athletes is effectively balanced by the recruitment of both *endogenous and dietary* antioxidants, resulting in the absence of lipid peroxidation" (Andersson et al., 2010 a). "The soccer-associated dietary antioxidant defence, but not the *endogenous* antioxidant defence, is persistent" (Andersson et al., 2010 b). "Consumption of 1-1.5 L · d(-1) of NAB (*nonalcoholic beer*) for 3 wk before and 2 wk after marathon competition reduces postrace inflammation and URTI (upper respiratory tract illness) incidence" (Scherr et al., 2012). "That oligonol (a *lychee fruit*-derived low-molecular form of polyphenol) activates the Ras/Raf-1/MEK (MAPK/ERK kinase) 1/2 signaling pathway, independent of the IL-6 signaling pathway, leading to activation of ERK (phosphorylated extracellular-signaling regulatory kinase) 1/2 proteins in primary adipocytes" (Ogasawara et al., 2010). "Consuming a high-polyphenol diet (*purple sweet potato leaves (PSPL)*) for 7 days can modulate antioxidative status and decrease exercise-induced oxidative damage and pro-inflammatory cytokine secretion" (Chang et al., 2010).

Cocoa polyphenols

"Regular DC (*dark chocolate*) intake is associated with reduced oxidative-stress markers and increased mobilization of free fatty acids after exercise but has no observed effect on exercise performance" (Allgrove et al., 2011).

Coffee polyphenols

"*Caffeic* acid but not chlorogenic acid acutely stimulates skeletal muscle AMPK (5'-adenosine monophosphate-activated protein kinase) activity and insulin-independent glucose transport with a reduction of the intracellular energy status." (Tsuda et al., 2012).

Apple polyphenols

"Dietary APPs (*apple* polyphenol) have protective effects against lengthening contraction-induced muscle injury" (Nakazato et al., 2010).

Grapes polyphenols

"D organic *grape* juice has a positive effect in endurance athletes" (Gonçalves MC et al., 2011). "The antioxidative properties of OGSP (oligomerized *grape* seed polyphenol) attenuate inflammatory changes induced by the coculture of adipocytes and macrophages" (Sakurai et al., 2010).

Tea polyphenols

"The coordinated direct effect of *mixed polyphenol*, which comprises oligonol, on ERK (extracellular signalling-related kinase) 1/2 plays a key role in a greater lipolytic response to oligonol than EGCG (*tea* (-)-epigallocatechin-3-gallate) alone" (Ogasawara et al., 2011).

Green tea polyphenols

"Acute ingestion of *GTP* (640 mg) does not attenuate exercise-induced oxidative stress and muscle damage" (Jówko et al., 2012). "*GTP* supplementation, TC ((ai Chi) exercise, and the combination of the two all improved muscle strength in postmenopausal women with osteopenia" (Shen et al., 2012). "On previously untrained men, dietary supplementation with GTE (*green tea* extract) (in combination with strength training) enhances the antioxidant defense system in plasma at rest and, in turn, may give protection against oxidative damage induced by both short-term muscular endurance test and long-term strength training" (Jówko et al., 2011). "*GTP* at a dose of 500 mg/day and/or TC exercise at 3 hr/week for 24 weeks

appear to be safe in postmenopausal osteopenic women, particularly in terms of liver and kidney functions" (Shen et al., 2010).

The analysis of the favorable conclusions for S+P over the years 2010-2012 demonstrates the efficiency of the use of polyphenols in various forms of sport, with beneficial effects on the body, of which the most important are antioxidant, antiinflammatory effects, as well as those on adipose tissue. Although the number of publications for S+P is small and the researchers involved are few, the results obtained are encouraging.

Conclusions

1. The study, although analyzing a long time period, 52 years, totals a small number of publications, 35.

2. The number of publications with free full text is low compared to the total number of articles, which could be an impediment to consult the details for those with modest financial possibilities,

3. For a group of selected key words, the favorite studies were in human subjects, especially men, mostly aged between 19-44 years.

4. The most commonly chosen publication type of those selected is the journal article item.

5. Studies on sport and polyphenols are diversified across several types of polyphenols, and out of a total number of 17 studies, with the search combination "sport AND polyphenols", found for the 2010-2012 period, 16 have favorable conclusions for the use of polyphenols in sports.

6. Although the number of publications for the "sport AND polyphenols" combination is reduced, and the researchers involved are numerically few, the relationship between sport and polyphenols is important by the value of the two subjects and the published results may be regarded as encouraging for further study in this research direction.

Conflicts of interest

Nothing to declare.

Acknowledgement

Many thanks to Eng. Nicolae Colceriu, PhD, USAMV Cluj-Napoca, for the help in collecting PubMed data, Dr. Cristian Bodescu, MD, PhD student, S.C. Spa treatment Buziaș, for advice on statistical processing of the results, Dr. Ioana Jurcău, MD, PhD, Pediatric Clinical Hospital Cluj-Napoca, for advice on the English translation.

Funding for the study was obtained from sponsorships.

References

Allgrove J, Farrell E, Gleeson M, Williamson G, Cooper K. Regular dark chocolate consumption's reduction of oxidative stress and increase of free-fatty-acid mobilization in response to prolonged cycling. Int J Sport Nutr Exerc Metab. 2011;21(2):113-123.

Andersson H, Karlsen A, Blomhoff R, Raastad T, Kadi F. Active recovery training does not affect the antioxidant response to soccer games in elite female players. Br J Nutr. 2010b;104(10):1492-1499.

Andersson H, Karlsen A, Blomhoff R, Raastad T, Kadi F. Plasma antioxidant responses and oxidative stress following a soccer game in elite female players. Scand J Med Sci Sports. 2010a;20(4):600-608.

Bao MJ, Shen J, Jia YL, Li FF, Ma WJ, Shen HJ, Shen LL, Lin XX, Zhang LH, Dong XW, Xie YC, Zhao YQ, Xie QM. Apple polyphenol protects against cigarette smoke-induced acute lung injury. Nutrition. 2012 Sep 8. [Epub ahead of print]

Chang WH, Hu SP, Huang YF, Yeh TS, Liu JF. Effect of purple sweet potato leaves consumption on exercise-induced oxidative stress and IL-6 and HSP72 levels. J Appl Physiol. 2010;109(6):1710-1715.

Gonçalves MC, Bezerra FF, Eleutherio EC, Bouskela E, Koury J. Organic grape juice intake improves functional capillary density and postocclusive reactive hyperemia in triathletes. Clinics (Sao Paulo). 2011;66(9):1537-1541.

Jówko E, Sacharuk J, Balasińska B, Ostaszewski P, Charmas M, Charmas R. Green tea extract supplementation gives protection against exercise-induced oxidative damage in healthy men. Nutr Res. 2011;31(11):813-821.

Jówko E, Sacharuk J, Balasinska B, Wilczak J, Charmas M, Ostaszewski P, Charmas R. Effect of a single dose of green tea polyphenols on the blood markers of exercise-induced oxidative stress in soccer players. Int J Sport Nutr Exerc Metab. 2012;22(6):486-496.

Khan N, Mukhtar H. Modulation of signaling pathways in prostate cancer by green tea polyphenols. Biochem Pharmacol. 2012 Oct 3. [Epub ahead of print]

Mar Q, Marta M, Amaya A. Beneficial effects of polyphenols on cardiovascular disease. Pharmacol Res. 2012 Nov 19. [Epub ahead of print]

Morillas-Ruiz JM, Villegas García JA, López FJ, Vidal-Guevara ML, Zafrilla P. Effects of polyphenolic antioxidants on exercise-induced oxidative stress. Clin Nutr. 2006;25(3):444-453.

Murase T, Haramizu S, Shimotoyodome A, Tokimitsu I, Hase T. Green tea extract improves running endurance in mice by stimulating lipid utilization during exercise. Am J Physiol Regul Integr Comp Physiol. 2006; 290(6):R1550-6.

Nakazato K, Ochi E, Waga T. Dietary apple polyphenols have preventive effects against lengthening contraction-induced muscle injuries. Mol Nutr Food Res. 2010; 54(3):364-372.

Ogasawara J, Kitadate K, Nishioka H, Fujii H, Sakurai T, Kizaki T, Izawa T, Ishida H, Tanno M, Ohno H. Oligonol, an oligomerized lychee fruit-derived polyphenol, activates the Ras/Raf-1/MEK1/2 cascade independent of the IL-6 signaling pathway in rat primary adipocytes. Biochem Biophys Res Commun. 2010; 402(3):554-559.

Ogasawara J, Kitadate K, Nishioka H, Fujii H, Sakurai T, Kizaki T, Izawa T, Ishida H, Ohno H. Comparison of the effect of oligonol, a new lychee fruit-derived low molecular form of polyphenol, and epigallocatechin-3-gallate on lipolysis in rat primary adipocytes. Phytother Res. 2011; 25(3):467-471.

Sakurai T, Kitadate K, Nishioka H, Fujii H, Kizaki T, Kondoh Y, Izawa T, Ishida H, Radák Z, Ohno H. Oligomerized grape seed polyphenols attenuate inflammatory changes due to antioxidative properties in coculture of adipocytes and macrophages. J Nutr Biochem. 2010;21(1):47-54.

Sakurai T, Ogasawara J, Kizaki T, Ishibashi Y, Sumitani Y, Takahashi K, Ishida H, Miyazaki H, Saitoh D, Haga S, Izawa T, Ohno H. Preventive and improvement effects of exercise training and supplement intake in white adipose tissues on obesity and lifestyle-related diseases. Environ Health Prev Med. 2012;17(5):348-356.

Scherr J, Nieman DC, Schuster T, Habermann J, Rank M, Braun S, Pressler A, Wolfarth B, Halle M. Nonalcoholic beer reduces inflammation and incidence of respiratory tract illness. Med Sci Sports Exerc. 2012;44(1):18-26.

Shen CL, Chyu MC, Pence BC, Yeh JK, Zhang Y, Felton CK, Doctolero S, Wang JS. Green tea polyphenols supplementation and Tai Chi exercise for postmenopausal osteopenic women: safety and quality of life report. BMC Complement Altern Med. 2010;10:76.

Shen CL, Chyu MC, Yeh JK, Zhang Y, Pence BC, Felton CK, Brismée JM, Arjmandi BH, Doctolero S, Wang JS. Effect of green tea and Tai Chi on bone health in postmenopausal osteopenic women: a 6-month randomized placebo-controlled trial. Osteoporos Int. 2012;23(5):1541-1552.

Tsuda S, Egawa T, Ma X, Oshima R, Kurogi E, Hayashi T. Coffee polyphenol caffeic acid but not chlorogenic acid increases 5'AMP-activated protein kinase and insulin-independent glucose transport in rat skeletal muscle. J Nutr Biochem. 2012;23(11):1403-1409.

Ulrich-Merzenich G, Kelber O, Koptina A, Freischmidt A, Heilmann J, Müller J, Zeitler H, Seidel MF, Ludwig M, Heinrich EU, Winterhoff H. Novel neurological and immunological targets for salicylate-based phytopharmaceuticals and for the anti-depressant imipramine. Phytomedicine. 2012;19(10):930-939.

Vasanthi HR, ShriShriMal N, Das DK. Phytochemicals from plants to combat cardiovascular disease. Curr Med Chem. 2012;19(14):2242-2251.

Palestrica of the third millennium – Civilization and Sport
Vol. 13, no. 4, October-December 2012, 348–353

CASE STUDIES
STUDII DE CAZ

Application of mechatronics systems to 110 meters hurdles training – a case report

Modalităţi de aplicare a sistemelor mecatronice în antrenamentul probei de 110 metri garduri – studiu de caz

Florentina Nechita
Faculty of Physical Education and Mountain Sport, "Transylvania" University, Braşov

Abstract

Background. The idea behind the study is that the structure of the 110 meters hurdles tryout includes a relatively large range of technical elements, which, by their assembly, involves drivelines in motion and offers the chance to study different kinematics parameters. This tryout reveals a high degree of technical complexity, involving ample resources in training techniques in order to improve the training methods.

Aims. This research concerns the analysis of the hurdles runner's step technique at the case study level. Reporting experimental research on this case contributes to a very positive effect in improving technique based on extrinsic feedback.

Methods. In this research, the kinematics parameters of the hurdles runner's pace obtained by comparing data are dependent on the investigation conducted by the video analysis method.

By using the video analysis method, record processing methods were highlighted, methods based on a video analysis software which emphasised the possibilities of capturing and observing the technical execution of hurdles runner's stride by changing each sequence in time and by transferring the sequences in descriptive points per millimetre sheet. This allows the specialized information to be operated upon and organised, thus obtaining precise qualitative and quantitative evaluation.

Results. The progress of the values to kinematics parameters F2 and F3 shows that the work focused specifically on existing faults, positive values of 8° upturn being registered at the moment of the hurdle attack and 12° in the downward phase when landing after the hurdle.

Conclusions. Based on the performance achieved by the athlete (junior national champion, I, 60 mg - 8.16 sec., 2011) the kinematics parameters values obtained are important factors in the efficiency of the hurdles runner's stride.

Keywords: sports training, kinematics, technique, 110 meters hurdles race.

Rezumat

Premize. Ideea care stă la baza studiului este că structura probei de 110 metri garduri cuprinde o gamă relativ mare de elemente tehnice, care prin asamblarea lor implică în mişcare lanţuri cinematice sau oferă studierea diferiţilor parametri cinematici. Această probă scoate în evidenţă o tehnică cu un grad mare de complexitate, fapt care implică o amplă organizare în pregătirea sportivă, vizând ameliorarea tehnicii acestei probe.

Obiective. Cercetarea se referă la analiza tehnicii pasului alergător de garduri la nivelului studiului de caz CA. Raportarea cercetării experimentale asupra acestui caz contribuie la obţinerea unor efecte pozitive în perfecţionarea tehnicii pe baza unui feedback extrinsec.

Metode. În cadrul cercetării, valorile parametrilor cinematici ai pasului alergător de garduri obţinute prin compararea datelor devin dependente de investigarea realizată prin metoda analizei video.

Prin utilizarea metodei analizei video s-au evidenţiat modalităţile de prelucrare a înregistrărilor pe baza unor software de analiză video, subliniindu-se posibilităţile de captare şi de constatare a execuţiei tehnice a pasului alergător de garduri, prin modificarea fiecărei frecvenţe în timp şi transpunerea secvenţelor în puncte descriptive pe foaia milimetrică. Acest lucru permite o exploatare şi o închegare a tuturor informaţiilor de specialitate, obţinându-se astfel o evaluare calitativă şi cantitativă precisă.

Rezultate. Progresul valorilor la parametrii cinematici F2 şi F3 denotă faptul că s-a lucrat concret pe greşelile existente determinate, înregistrându-se valori favorabile de 8° în faza ascendentă în momentul atacului gardului, iar la faza descendentă în momentul aterizării după gard de 12°.

Concluzii. Pe baza performanţelor sportive obţinute de către atletul CA (campion naţional de juniori I, 60 mg – 8,16 sec., 2011) valorile obţinute la parametrii cinematici devin factori importanţi în eficienţa pasului alergător de garduri.

Cuvinte cheie: antrenament, cinematică, tehnică, proba de 110 m garduri.

Received: 2012, October 28; *Accepted for publication:* 2012, November 16
Address for correspondence: Faculty of Physical Education and Mountain Sport, Transylvania University, Braşov, Colina Universităţii str. no.1, code 500068
E-mail: florenechita1977@yahoo.co.uk

Introduction

Starting from the idea that sports training is a complex process, we must consider the fact that there is a time when the adaptation stimuli acting on the athlete are determined by a dynamic integration of different factors, such as: management of the subject and of the specialists, financial conditions etc. The various specialized studies have developed principles, rules and norms of particular value in practice.

The concept of sports training is the main element linking specialists in the field literature as it is an important factor in action sports (Allen, 1976; Ballesteros, 1993; Demeilles, 1985; Bompa, 2000; Homenkov, 1963; Wazny, 2000).

Kirsch (1969) presents the basic sports training, which prepares the basis of performance. The author refers to the planned development of physical qualities and specific learning of the basic motor skills in the sports industry. From this point of view, the author mentions that the purpose of sports training is to direct the athlete towards "maximum personal performance".

Sports training can be understood as a "group of actions performed in a lesson or in a series of lessons for the precise effects resulting in expression embodied in the sports results or performance or it may be understood as an assembly of theoretical and practical actions taken to produce sports performance. The sports training is based on a workout plan that includes goals (final, intermediate and initial), contents, methods, operating systems (means/ exercise) and control samples" (Rață, 2005).

We have to also take into account the great enthusiasm of the studies oriented towards the analysis of genetic factors, hereditary skills of athletes, thereby selecting athletes and even shaping the future after proper preparation.

Skinner (2010) argues that the influence of genetic factors is modelled by practicing exercise. The author presents genetic background as being the crucial condition of the human body in terms of physical activity and health. He defines training as follows: "training status is an art and a science," believing that if you try some form of exercise and it pays off, you can start another form in order to obtain optimum efficiency.

Significant factors in achieving peak performance are those developing and improving sports personality. Training as a lengthy process influences the sportsman's personality, thus being very important to focus on the knowledge and to careful monitor the conduct of the athletes and to develop the necessary qualities for adaptation at all levels. The stage nature of the training particularly influences the personality through the content and nature of socio-cultural influences.

Monea & Monea (2008) pointed out that "upgrading the training process involves finding the most efficient ways, means and methods to achieve high performance".

Due to the technical development and training methodology, a significant increase in performance in various sports has been noted. Modern methods of training increasingly focus on the maximum development of motor actions, together with the process of acquiring the corresponding technique.

It is recommended, in the training of athletes, to use a type of training based on a number of tools and procedures in order to induce improved results, including mental training.

Grosz (2009) and Vealey (1991) present mental training as a display of operational movements:

- The items of the sports technique are structured by the coach together with the athlete.
- The objectives of this mental exercise will be "drawn from video observations, verbal information and information on the movements of the athletes".
- The great importance of the essence of the professor - athlete pair regarding a complex of movements, the steps that will be recorded, coded and internalised, especially by young juniors.

The most important steps with a high degree of practicality are targeted, such as: "setting the ideal technique based on viewing the records depicting the evolution of an experienced sports model, viewing and analysing an athlete's training errors and raising awareness regarding the elements that were performed correctly."

The learning of any motor act is based on the existing models in the literature obtained from numerous and extensive biomechanical studies (1), (2), (3). This refers specifically to the basic mechanism of driving ability and the details of its implementation (Dragnea quoted by Potop et al., 2010).

Outlining the basic elements of human movement is based on a continuous improvement of tools and methods used for the monitoring of its technical aspects. This shows the effectiveness of the means used in the sports training process (Mihai, 2010).

Bidiugan (2009) states that sports training methodology requires adaptation to the influence of technology, thereby achieving an objective type of control of the development of athletes during training and competition.

Hypothesis

The quantification of individual independent variables of the hurdles runner's stride techniques provides objective monitoring of the tryout tested and promotes the optimisation of the quality level of technical training.

Material and methods

a) *Research Protocol*

The period of research experiments was October 2009 - August 2010 and actions taken included three tests: initial testing - T1 (October 2009), intermediate testing - T2 (April 2010) and final testing - T3 (August 2010).

Video recordings took place in two different locations, namely The Olympic Stadium of Poiana Brașov and "Dumbrava Minunată" Brașov.

In terms of the sequence of covering the research, the process steps and activities were:

Stage I - T1 included initial activities in the context of setting the kinematics parameters:

- Recording the hurdles runner's stride under standard conditions for the case study;
- Processing video analysis and quantitative determination of kinematics parameters;
- Detecting technical errors in video analysis;

- Designing the technical training purposes for improving the correction of errors that were objectively detected for the kinematics parameters.

Stage II - T2

- Comparative analysis between T1 and T2 values;

- Developing an individualized training program for optimizing kinematics parameter values, including the hurdles runner's stride technique.

Stage III - T3

- Comparative analysis of kinematics parameter values at T2 - T3.

b) *Subjects*

The research subject is a junior category I athlete, ranked top 10 at the Junior National Championship in the 110 meters hurdles tryout. Being in a state of early education and intervention, at this level, training can bring real benefits in terms of strengthening and improving sporting technique based on extrinsic feedback.

c) *Materials*

In this research, regarding the step of the hurdles runner, the optical image system (sheet millimetre) was used, by developing mathematical coordinates for each phase investigated. This system revealed something that is very important, namely transforming images into numerical data. Thus, the images of the hurdles runner's pace recorded by the camera indicate duration of movement, movement speed, horizontal distance and angles in attacking the hurdles and landing phases.

Imaging refers to a specific subject performing motor action as figurative reproduction. Thus, the athlete's action is obtained in the phase of crossing the hurdles, with the possibility of observing the athlete's technique through the use of the AVI playback in the frame, scoring the decisive moment of technical execution, which is important for the subject and the researcher.

d) *Methods*

For this study, the most important method was the video analysis, which enabled us to process video images based on video analysis software (Nechita & Mihailescu, 2010), and scientifically outlined millimetre based methods of calculation.

This method is applied and used for athletic training as a means of correcting technical errors in the 110 meters hurdles tryout in order to achieve sports performance. This method indicates a way to improve running technique in hurdling.

Way of illustration of measuring kinematics parameters

The indicators of kinematics parameters used for the monitoring of the technical preparation of the 110 meters hurdles tryout are:

Vx – The speed of horizontal separation when attacking the hurdle;

Vy – The speed of horizontal landing;

Hs – **The hip point height above ground;**

Hsg – **The maximum distance of the point of the hip** over the hurdle;

F2 – The angle of the scapular-humeral joint with the ankle joint on attacking the hurdle;

F3 – The angle of the scapular-humeral joint with leg (attacking leg), when landing on the ankle joint;

Vtg – **Phase of flight time over the hurdle;**

Dx – The horizontal distance to the hurdle plane;

Dy – The horizontal distance of the landing after the hurdle.

The working procedure used is based on advanced technological tools: computer software and video analysing it. After designing of these compositions, digitalisation is used to mark each parameter separately depending on each of the motor cinematic action phases. These specific motor phases of the hurdles runner's step will be found under the following names:

F1 - pulse phase before hurdle;

F2 - attacking ascending phase;

F3 - shift of the hurdle phase;

F4 - landing descending phase;

F5 - touching the ground phase.

Each phase has a coefficient called the "frame" and shared playing time. Processing AVI focuses on the following possibilities:

- Making compositions using the software;

- Transporting the images through each phase (F1, F2, F3, F4 and F5) using spread sheets and their translation into descriptive points;

- Turning the descriptive figurative points into representations on the millimetre sheet;

- Signalling the origin of the system on the image (sheet millimetre) by developing mathematical coordinates for each stage investigated (Fig. 1).

e) *Statistical methods*

The comparative analysis of the case study is based on descriptive research instruments (imaging mathematical coordinates) (Fig. 1), applying the techniques of observation and data collection from all three assessments: initial, intermediate and final. This analysis is a qualitative method because it emphasizes the individualization of the athlete. Following the minute character of this analysis it can be said that the research conducted the comparative analysis of the determined kinematics parameter values.

The research approach is reflected in defining and describing the current situation as a comparative analysis between T1 and T3 (Table III). From a statistical point of view, the comparison of kinematics parameters of the hurdles runner's pace gives a descriptive study that highlights the relationship between Ox and Oy variables (mathematical coordinates).

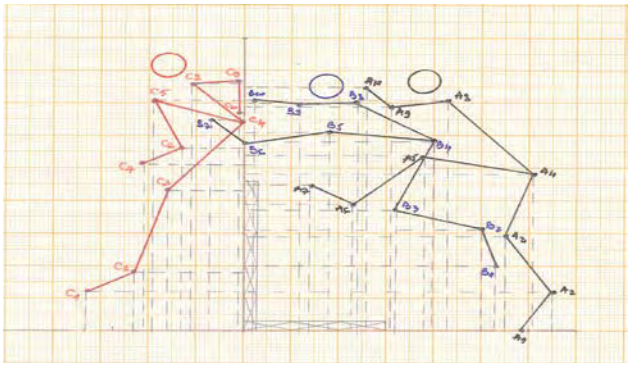


Fig. 1 – Figurative system, descriptions points A, B and C for phases F1, F2 and F3, CA.

This document provides a record for an individual athlete by developing a system of origins of each parameter using pairs of mathematical points (sets of numbers), which records and monitors at the same time kinematics parameter values for each step over the hurdle.

The descriptive representation for the hurdles runner's pace phases consists in the setting of moments of data observation using a system determined by pairs of points, which are then converted into mathematical coordinates (Ox, Oy). The exemplifying of the descriptive imaging transferred into figurative presentation for the "*horizontal separation speed when attacking the hurdle, in the case study*, CA" indicator is:

Vx consists of the following coordinates:

• F1, point A – frame 72, 2.38 sec. playback time;

• F2, point B - frame 99, 3.27 sec. playback time;

• F3, point C – frame 147, 4.85 sec. playback time;

Frame 72 = {A1, A2,....A10};

Frame 72 {A1 (5.9; 0); A2 (6.5; 1.2); A3 (5.5; 2.9); A4 (6.1; 4.8) A5 (3.8; 5.9); A6 (2.3;3.9); A7 (1.4; 4.5); A8 (4.3; 7.1); A9 (3.1; 6.9); A10 (2.6; 7.5)};

Frame 99 = {B1, B2,....B10};

Frame 99 {B1 (5.3; 2); B2 (5; 3.1); B3 (3.2; 3.7); B4 (4; 5.8) B5 (1.8; 6.1); B6 (0; 5.7); B7 (-0.7; 6.5); B8 (2.4; 7); B9 (1.2; 6.9); B10 (0.2; 7.1)};

Frame 147 = {C1, C2,....C10};

Frame 147 {C1 (-3.3; 1.2); C2 (-2.3; 1.8); C3 (-1.7; 4.3); C4 (0; 6.4) C5 (-1.9; 7.1); C6 (-1.3; 5.6); C7 (-2.1; 5.1); C8 (-1.1; 7.6); C9 (-0.1; 7.7); C10 (-0.1; 6.7)};

t = changes Frame 72, Frame 99, Frame 147/time unit;

t = (2.38+3.27+4.85)/25 frames/sec.;

t = 0.42 sec. real time;

Vx = d/t;

Vx = 1.3685 m/0.42 sec.;

Vx = 3.25 m/sec.

The kinematics parameter values were recorded on individual data sheets at the moments when they were determined. Their record allows for the observation of positive or negative time and the correction of objectively detected technical individual errors.

Results

Methodological recommendations on optimizing technical training workout

After the determination of kinematics parameters values, the following technical faults of the subject (CA) were found:

Table I

Technical errors detected by video analysis CA, T1.

Kinematics parameters	Technical errors CA/T1
Vx	Work movements involved in F1-F3 phases are slow.
Vy	The moment of "floating" from the hurdle plane to the ground.
Hs – Hsg	Too high hurdle crossing.
F2	Inadequate trunk working when crossing the hurdle.
F3	The descent stage of the attacking leg with the trunk slightly bent backward.
Vtg	The work of the segments involved in the crossing of the hurdle is too slow.
Dx	The placement of the trailing leg before the hurdle is inadequate.
Dy	Improper movements of the foot descent on attacking the hurdle

The identified faults are due to the following aspects (Table II):

Table II

Causes of errors determined from video analysis in CA T1.

Case study	Technical errors	Causes of errors
CA	The activity of the movement involving F1-F3 phases is slow.	Lack of coordination of movements involved in the attack of the hurdle and poor development of motor qualities involved in the movement.
CA	The moment of "floating" from the hurdle to the ground.	The mass centre of the body is located too high above the hurdle.
CA	Too high hurdle crossing compared to both models.	The distance from which the hurdle is attacked is too small.
CA	Inappropriate working of the trunk when crossing the hurdle.	Insufficient bending of the trunk when crossing the hurdle.
CA	Improper movements of the attacking leg after descending.	Lack of forward trunk bending during landing after the hurdle.

Correcting the determined technical errors after the initial assessment can be made easier using video analysis, which has the role to show the mistakes in the hurdle crossing phase sequence. The correction of mistakes should start with the errors in the crossing of the hurdle and only subsequently will the other technical mistakes of secondary importance be eliminated. However, in many cases the correction of the main errors entails the correction of secondary ones.

After finding these technical mistakes with the help of this software and identifying the causes of the errors, there is a shift in sports practice towards the correct methodology, using specific individual work, with a variety of specific exercises, aimed at effectively correcting technical errors.

Thus, the study of video analysis objectively determines the necessary methods for correcting the technique, based on the kinematics modelling parameters that play an important role in analysing the athlete's own movements when crossing the hurdle. It provides athletes with the opportunity to compare model results to their own representations.

After an appropriate routing of the specific preparation indicators, the negative effects of technology improved towards the end of the annual cycle, which is demonstrated by the comparative dynamics of the formulated value of T1 and T3 - case study (CA). We should mention that the test subject was recovering from an injury at T2, but this obstacle was overcome, the subject having positive values, thus confirming the effectiveness of the individualized amendatory training program applied.

Table III

Comparative dynamics of the formulated value of T1 and T3, CA.

Kinematics parameters	CA		Differences CA/T1-T3
	T1	T3	
Vx	3.25 m/sec	2.49 m/sec	0.76 m/sec
Vy	1.04 m/sec	1.02 m/sec	0.02 m/sec
Hs	1.4845 m	1.4613 m	0.0232 m
Hsg	0.4175 m	0.3943 m	0.0232 m
<F2	40°	32°	8°
<F3	110º	98º	12°
Vtg	0.510 sec	0.707 sec	0.197 sec
Dx	1.3685 m	1.5541 m	0.1856 m
Dy	0.6494 m	0.8350 m	0.1856 m

Toma (2002) states that sciences (mathematics, informatics and cybernetics) are becoming increasingly retrievable in the field of sports, becoming the essence of sports training. The author says that, at a global level, they are "basic components in training not only for great performers, but also in the preparation of future performers". If we relate our findings to the essence of the article, we can conclude from what the aforementioned author states that research is based on the opportunity to experience "effects, limitations and advantages of new technologies" and the use of the camera and image processing in the case of athletes is part of this (Toma, 2002).

Discussion

The technical correction of the determined errors can be done easily using video analysis, which shows the mistakes in the hurdle crossing phase sequence.

Table III presents the kinematics parameters determined from tests T1 and T3 and the differences between these tests.

- CA has a difference in horizontal velocity to the hurdle plane of 0.76 m/sec. This difference is favourable because the subject improved the Dx parameter value. The subject experienced an increase of 0.18 m in the Dx parameter.

- The parameter Vy: CA has a difference of 0.02 m/sec. This difference expresses an improvement in the Dy technical parameters. The subject showed an improvement of 0.18 m.

- The comparative analysis of the Vtg parameter shows a value of 0.19 sec. This reflects an individual technical improvement in this parameter.

- Values of parameters Hs and Htg: positive differences were found. The reported differences were 0.02 m. This shows the improved technique in crossing the hurdle, which confirms that work was efficiently done based on the training program.

- Individual progress is favourable for F2 and F3, from 40° to 32° in F2 and 110° to 98° in F3. This results in a favourable difference of 8° and 12° in F2 and F3.

- In terms of the kinematics parameters Dx and Dy, CA has a difference of 0.18 m for Dx and Dy. We can say that these are the most important parameters because their values depend on other kinematics parameters involved in the act of crossing the hurdle.

These comparative increases from a test to another over a relatively short time period suggest the performance of efficient work aimed at improving the runner's stride technique and thus achieving athletic hurdles performance.

Conclusions

1. Using the "Adobe after effects" and "Quick AVI Splitter" software, an example of good practice in the use of advanced technology, for measuring and analysing kinematics parameters of hurdles runner's pace for the purpose of monitoring the various stages of preparation proved to be an adequate technical training objective for the 110 meters hurdles tryout.

2. The video analysis revealed a series of technical mistakes in the execution of the hurdles runner's steps, deficiencies in technical training. After detecting the technical errors with this software and identifying the causes of errors in the kinematics parameters, we could move towards individualized correction methodology, using a variety of specific exercises for the effective correction of technical errors. Thus, the video analysis study objectively determined the methodical steps necessary for the rationalization of the technique, based on kinematics modelling parameters, with an important role in analysing the athlete's own movements when crossing the hurdle.

3. For the correct application of this interdisciplinary research we recommend the effective use of this sports training model, taking into account the methodological aspects of the tryout.

Conflicts of interests

Identifying the equipment and instruments within Department D04 "Advanced Mechatronic Systems", Faculty of Mechanical Engineering, Transylvania University Braşov.

Acknowledgement

The article is based on the results of the author's doctoral thesis.

References

Allen D. Antrenamentul ciclic-o metodă cu o largă adaptabilitate. În Sportul de performanţă 133. Ed. CCEFS, Bucureşti, 1976, 49-53.

Ballesteros JM. Manualul antrenamentului de bază. Ed. CCPS, Bucureşti, 1993; 5-64.

Bidiugan R. Analiza bibliografiei privitoare la utilizarea informaţiei de cinematică în sportul de performanţă. Raport de cercetare, nr.1, IOSUD Universitatea din Piteşti, FEFS, 2009.

Bompa T. Teoria şi metodologia antrenamentului - periodizarea. Ed. Ex Ponto, Bucureşti, 2002; 5-13.

Demeilles L. Antrenamentul atletic. Ed. CCEDT, Bucureşti, 1972; 141.

Grosz WR. Antrenamentul mental în schiul alpin. Internaţional Scientific Conference, New educational evolutions for sports, management, health therapy and free time in european context. Transilvania University of Braşov Publishing House, Braşov, 2009; 201-203.

Homenkov L.S. Bazele ştiinţifice ale sistemului contemporan de antrenament utilizat în atletism. Autoreferat al tezei de doctorat, Moscova, 1963; 23.

Kirsch A. Cu ce să începem sportul la copii şi juniori. Ed. SDIS, Vol III, Bucureşti, 1969; 38-39.

Mihai I. Researches concerning the utilization of the kinematicanalysis movement software in 2d system - Dartfish in the male triple jump event technique monitoring. Ovidius University Annals-Series Physical Education and Sport, Supp, 2010; 10(2):517-520.

Monea G, Monea D. Măsurări şi evaluări în sportul de performanţă, Ed. GMI. Cluj-Napoca, 2008; 122.

Nechita F, Mihăilescu L. Optimizarea pregătirii tehnice prin monitorizarea elementelor cinematice în proba de 110 metri garduri. Palestrica Mileniului III, 2010; 11(4):357-361.

Potop V, Câmpeanu M, Toma-Uricheanu S. Influenţa mijloacelor specifice de pregătire şi dinamica parametrilor efortului în învăţarea elementelor tehnice din gimnastica artistică feminină. Palestrica Mileniului III. 2010; 11(4):332-339.

Raţă G. Psihopedagogia sportului de performanţă. Note de curs, Ed. Univ. Bacău, 2005; 7-12.

Skinner JS. The influence of genetic factors on the response to exercise and training general principles of exercise prescription. Conf. Fitness and Physical Activity, Braşov, 2010, mai 27.

Toma Ş. Utilizarea simulatorului de condiţii ca mijloc de corectare a tehnicii la copii înotători (10-12 ani) (note preliminare). Preocupări actuale de optimizare a activităţii de educaţie fizică şi sportive de performanţă. Conferinţă Internaţională de Comunicări Ştiinţifice, Galaţi, 31 mai-1 iunie 2002; 195-199.

Vealey RS. Antrenamentul intern prin reprezentare mentală. Sportul de performanţă 315. Ed. CCPS Bucureşti, 1991; 31-42.

Wazny Z. Dezvoltarea sistemului de antrenament sportiv. Metodologia antrenamentului. Ed. CCPS, Bucureşti, 2000; 51-75.

Visited Websites

(1) Milan Č. Colin Jackson's Hurdle Clearance Technique. Biomechanical Laboratory, Faculty of Sport, University of Ljubljana, Slovenia - http://www.coachr.org/hurdles.htm visited 2010

(2) McDonald C. Indiana University The Angular Momentum Of Hurdle Clearance. http://www.coachr.org/hurdles.htm visited 2010

(3) Kruger A, Edelmann-Nusser J. Biomechanical analysis in freestyle snowboarding: application of a full-body inertial measurement system and a bilateral insole measurement system. Sports Technology. 2009; 2(1–2):17-23 http://onlinelibrary.wiley.com/doi/10.1002/jst.89/pdf visited 2010.

Palestrica of the third millennium – Civilization and Sport
Vol. 13, no. 4, October-December 2012, 354–357

REVIEWS
ARTICOLE DE SINTEZĂ

The management of organizing and conducting sports training for a high jumper during a year of preparation
Managementul organizării și conducerii pregătirii sportive a unui atlet, săritor în înălțime, pe parcursul unui an de pregătire

Alexandru Bondoc-Ionescu[1], Mircea Neamțu[2]
[1]*Sports High School, Braşov*
[2]*Faculty of Physical Education and Mountain Sport, "Transylvania" University, Braşov*

Abstract

Management in sports competition represents a part of the activity to manage and conduct, referring to previsions, planning, organization, coordination and control, as a form of human, material and informational resource coordination, which lead to making decisions in order to reach an objective of performance within a sport area or a sports trial. It is the process of rationalizing and making efficient work within training, being part of the requirements of scientific management.

In this paper, the important elements of management in performance sports are taken into consideration, looking for as many associations as possible determined by a series of variables, taking into account the socio-human determination, technical-material determination, the level of training, possibilities of perfection, with suggestions to promote a series of relational schemes adapted to conducting training processes.

Keywords: managerial system, aspects regarding management and methodology, performance sports, managerial plan, representative diagrams, managerial model.

Rezumat

Managementul în sportul competițional este unul dintre aspectele activității de conducere care se referă la prevederi, planificări, organizări, coordonări și control ca formă de coordonare a resurselor umane, materiale și informaționale care duc la luarea unor decizii în vederea atingerii unui obiectiv de performanță dintr-o ramură sportivă sau o probă sportivă. Este un proces de raționalizare și eficientizare a muncii în cadrul antrenamentului, încadrându-se în cerințele managementului științific.

În lucrarea de față se abordează elementele esențiale ale managementului în sportul de performanță, căutându-se cât mai multe relații determinate de o serie de variabile, ținându-se cont de determinarea socio-umană, determinarea tehnico-materială, nivelul de pregătire, posibilitățile de perfecționare cu propuneri de a promova o serie de scheme relaționale adaptate conducerii proceselor de antrenament.

Cuvinte cheie: sistemul managerial, aspecte metodologico-manageriale, sport de performanță, plan managerial, diagrame reprezentative, modelul managerial.

Introduction

In order to promote performance management and scientific conduct within sports training for high performance, the intervention of elements of the managerial system has to be taken into consideration in a systematic and contingent way, with the observation that every intervention on one element of the system has an influence on other systems, inter-relations and finalities, as well as the fact that every intervention has to be carried out only in the context of situational determination (Hoffman, 2004).

Constant improvement of the scientific conduct of a good preparation and planning of training, in this case of high jumpers, represents a desideratum that can be accomplished by using a rational normative strategy, on the basis of a general model of planning, according to modern competition requirements (Frâncu, 2003).

Within this systemic model, the following variables condition one another: strategies and tasks, organizational training structure, managerial and methodological aspects promoted in performance sports proper to programs and planning according to modern competition requirements (Adair, 2006).

The study starts from the premise that a managerial plan adequate for current performance requirements refers to approaching a rational-normative strategy based on programs and planning under strict managerial supervision, simplified by representative schemes and graphs, which can lead to the solving of scientific activity problems, with the final point in high performance level within competitions.

Received: 2012, June 26; *Accepted for publication:* 2012, August 20
Address for correspondence: Sports High School, Braşov, no. 39, Poarta Scheii Street, Post Office 50200
E-mail: bondocalexandru@gmail.com

The aim of these programs can be synthesized as making the most of the athlete's abilities as a high jumper, through an organized system of selection of the means of training, preparation for a determined time period and the improvement of sports results, achieving records and fulfilling objectives in a competition. Regarding the solution of scientific managerial activity concerning the objectives and the methodological design of training, the results lead to a structural and procedural organization of performance activity, which can be represented through schemes (I. Lador, 2000).

The fundamental objectives of the managerial method for conducting sports training are the following (Table I):

Table I

Fundamental objectives of the managerial method.

Objectives	Characteristics
- Training programs	- main objectives
- Projects for training lessons	- secondary objectives
- Programmed activities	- specific objectives
- Performance objectives	- individual objectives

(Moraru & Neamţu, 2000)

The main elements regarding sports training optimization refer to rationalizing, making efficient, diagnosing and estimating results and optimal performances. These imply **strategic objectives** from a scientific management point of view to conduct training specific for high jumps:

- the increase of quality regarding physical exercise with a view to making the best of the individual's abilities;

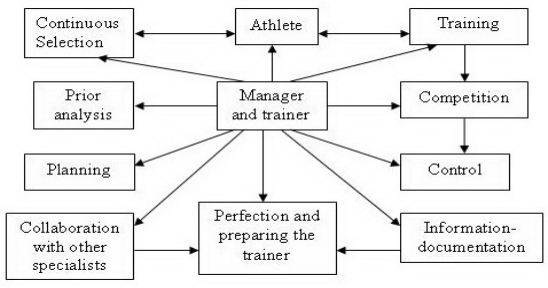
- diversification and improvement of the offer of the most modern exercises in order to fully use the athlete's potential;

- competition activities at club level, county level, championship finals, international competitions; (Percerou R. 1984, p. 28)

The managerial model adapted to actions of scientific research

It refers to the following stages: selection of strengths and recording of data from the training plan of the previous year, analyzing information, suggestion and objective formulation for the plan of the year in course, planning training and estimating future performance. These also represent the basis of some research methods specific for the area approached by the specialist manager (Black & Mouton, quoted by Pugh & Hickson, 1989).

Control practice is represented in Figure 1.



(Model suggested by the author, processed according to Drucker (2001), Mihailescu (2008)

Fig. 1 – Constant control practice.

The selection and prognosis of the most efficient *methods and tools* are carried out by the specialist manager, taking into account that no method is efficient in all situations and that change implies using combinations of methods and a situational-contingent approach, due to the fact that there is a possibility of change according to several variables of preparation for the competition (Ray, 1997).

Competition experience – a significant factor to value the potential of sport performance

The final way to verify from a managerial perspective the achievement of training tasks and to positively estimate the chosen methods is represented by the result obtained in high level competitions. From a statistical point of view, comparative referrals are made regarding both the performance evolution and the technical efficiency of the athlete (Mihăilescu, 2008).

From a managerial perspective, high level competition can be approached after carrying out a training program, set according to practical experience in previous competitions, correlated with the sportsman's personality as an optimal state, formed and refined during competition.

It is a relevant frame of conscious and responsible participation in training and competition. An essential role is played by the trainer, in collaboration with the doctor and psychologist, but in the end it is the athlete who decides, during the test, when he stands alone facing the opponent, the performance, the public and the other factors of the competition.

To gain competition experience, the athlete should preferably know *the value areas* where his performance is included. In this way, competitions have either a verification character or a training character to create *competitive attitude*, in which the competition becomes a *useful tool* for the elaboration of an optimal training model, leading to the conscious creation of a *psychological area* of volitional qualities, the athlete using his physical and nervous strength at maximum level.

There is the threat of exaggerated participation **"**from one competition to another**";** an *overdose of maximum effort* may emerge, leading to chronic mental fatigue, taking into consideration that the high jump trial involves special mental concentration, due to the specific neural-muscular explosive type of effort.

The informational aspect through statistics is significant, in order to observe if the athlete is able to enter the competition, this representing one of the essential assets of *sports mastership*, to build the athlete's confidence in his possibilities.

During the years of performance the athlete forms his capacity to rebuild *psychic potential*.

Sport specific mental energy can take away mental fatigue if the athlete shows passion, enjoyment for the practical test and after some years of competition he adapts to an optimal competition state, obtaining the result of a lifetime during the highest level competition (the Olympic Games or The World Championship).

When planning the preparation of a competition, the individual particularities of the athlete are to be taken into account, especially in the "moral volitional psychic area", because mental balance provides a better adaptation, and

the competition experience leads to the increase of "psychic potential" necessary for high performance; mental training is primarily important as "meditation on approaching the trial according to track, public opponents" and secondarily it increases the level of awareness of the activity.

After gaining competitive experience, judgment is formed, the capacity to concentrate during the trial increases, self-determination develops, "the competitive personality is formed, the image of execution is maintained in the consciousness" (Bondoc-Ionescu, 2004).

The biological part including the conscious self-adjustment of heart rate, as well as motility for high performance, should not be overlooked because mental forcing during competition creates negative neurovegetative disturbance.

If one becomes aware of the positive aspects achieved through competition, they can reach progress in performance.

In order to have an image of the managerial activity in the training of high jump athletes, a diagram will be used to help us extract the essential ideas, basic relations, knowing that an image is worth a thousand words (Fig. 2). The diagram is based on the affirmation that "you know what you have to do" which is related to the following essential ideas:

- you know what you have to learn;
- you know what you are able to do now;
- you know what you expect from the athletes;
- you plan action directions to reach the objective;
- you offer and give information;
- you maintain the trainer-athlete relationship;
- you make sure the plan is fulfilled.

In other words, with the help of procedural organization, answers are given to the questions "What will be done?" and "What do they need to know?" referring to those involved in sport activity.

Structural organization consists in grouping functions, activities, attributions and tasks according to certain criteria, by groups and persons, and in assigning them to organizational sub-divisions, with the purpose to accomplish them, to ensure better conditions in order to meet and exceed the organization's objectives (Nicolescu & Verboncu, 1996).

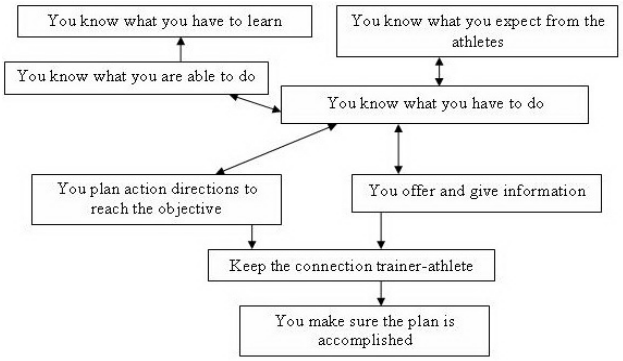


Fig. 2 – Suggested model for managerial relations within the annual planning.

All these are part of the management context that implies to forecast, to plan, to organize, to lead, to coordinate, to control. In sports training management, forecasting and planning means to evaluate the future performance objective and to initiate the essential measures (Balais et al., 2001).

The top manager model appropriate for the trainer is someone who leads through personal example, from the "battlefield", who inspires and stimulates the athletes in such a way as to become a combination of intellectual strength, practice and emotional impact (Lăzărescu, 1996).

Managerial stimulation activity within training and competition

Very often, situations are seen when the activity of training athletes for high jumps, which is initially interesting and stimulating, later becomes a burden. In this case, new incentives must appear -improved conditions or places to train or upgraded reward (Moraru & Neamțu, 2000).

If stressful conflict relations appear, the "keep your control" part comes up. If too many stressful situations occur, time is judiciously divided and one thinks about improving judgment. The following scheme is to be taken into account:

STAGE I
You get mobilized → the challenge raises your interest
STAGE II
Continuous activity → you lack energy
is tiresome
STAGE III
Activity becomes → the training tasks become
a burden more and more difficult

The decision is to search new solutions in a systematic way (Lăzărescu, 1996).

Managerial control, evaluation and decision of planning in the case of high jumpers

In order to make decisions and to estimate results, one of the directions of action is to set objectives, tasks that solve problems with programmed decisions based on prior experience. During training, having in view that training for high jumps is based specifically on approaching moments and technical elements, new decisions can appear which have to be adapted or changed. An important role is played here by managerial control during training, including choosing relevant dimensions based on which the progress in reaching the objectives will be measured, or setting standards of performance (Schwarz, 1997).

To develop control and planning as a *basic method*, an operational model for preparing and training high jumpers is shown below (Fig. 3):

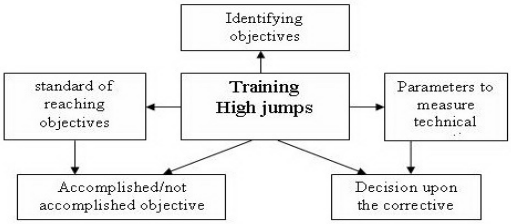


Fig. 3 – "Corrective loop" model in training for high jumps (model suggested by the author).

To elaborate a control *model*, the purpose of the action is taken into consideration, through feedback, in order to reduce the difference between the desired results (positive) and the obtained results, such as the difference between quality standards (for example: motility parameters of performance) and the quality verified by control tests.

An "iterative" model is a model that goes through a cycle repeatedly and comes back to the beginning stages. It is observed that in case of a possible failure a new target is set. This pattern is called "control loop". In order to manage the entire activity it is necessary and recommended that the athletes should have freedom of action, self confidence in their capacity to use their experience and get additional information, being aware of the importance of control (Soucie, 1997).

In this direction, a well elaborated control system offers the possibility to evaluate and improve performance. For this purpose, nowadays, advanced technology and appropriate devices for the purpose of training are used. Therefore, the control of motility parameters of performance and the actual quality can be relevant by using some devices which can contribute to solving low quality problems. (For example: the *Kistler platform* can record parameters of strength-power, area, direction and P.G.C acceleration, or the *Fastec Trouble Shooter video camera* can record 1000 frames per second, showing the PCG trajectory at all moments of the jump, especially when passing over the jumping lath). The study is in progress in order to experiment on high jump subjects of national worth.

These directions help not only the trainers but also the athletes that respond to some questions of *self-evaluation* (Mihăilescu, 2008):

- the stage where I was;
- the stage where I am;
- the stage where I want to be;
- the level of information I receive from the trainer and from the exterior;
- the interest I have in bringing improvement to performance;
- reaction when facing the disturbing factors;
- the way in which physical and intellectual resources are under my control;

Conclusions

1. Awareness means competence.
2. Competence means knowing the best way to conduct training for performance (as a manager).
3. It is necessary to choose the best way from all possibilities by evaluation and self-control (as an athlete), taking into account that failure, unsuccess also plays a beneficial role, because something good can be learned.
4. Positive emphasis can be placed on making harmonious and natural the activity of the manager-trainer, athlete, organization, family, society etc.

Conflicts of interests
Nothing to declare.

Acknowledgement
This paper is based on the partial results of the first author's doctoral thesis, which is currently in progress.

References

Adair J. Arta de a conduce. Ed. Cosmos Viking Pinguin. Bucureşti, 2006

Balais F, Mereuţă C, Hansa C. Managementul sportului. Ed. Academica, Galaţi, 2001, 219-239

Bondoc-Ionescu D. Dirijarea procesului de antrenament a atleţilor săritori în lungime de înaltă performanţă prin valorificarea experienţei competiţionale. Teza de doctorat, INEFS Chişinău, 2004, 140

Blacke şi Mouton, 1980 citaţi de Pugh şi Hickson, Managementul organizaţiilor. Ed. Codex, Bucureşti, 1989, 60

Drucker P. Managementul strategic. Ed. Teora, Bucureşti, 2001

Frâncu E. Managementul activităţii sportive. Ed. Ex Ponto, Constanţa, 2003, 34

Hoffman A. Structurile sportului. Ed. Fundaţiei România de Mâine, Bucureşti, 2004

Lador I. Bazele teoretice ale managementului în sport. Ed. Universităţii, Piteşti, 2000, 79

Lăzărescu A. Management, legislaţie, deontologie în sport. Ed. Fundaţiei România de Mâine, Bucureşti, 1996, 122-124

Mihăilescu N. Organizare şi conducere în structurile sportului. Ed. Universităţii din Ploeşti, 2008, 55, 65, 67

Moraru F, Neamţu M. Management şi legislaţie în educaţie fizică şi sport. Ed. Omnia Uni Sast, Braşov, 2000, 22

Nicolescu O, Verboncu I. Management. Ed. Economică, Bucureşti, 1996, 206

Percerou R (coord.). Entreprise, gestion et compétitivité. Ed. Economica Paris, 1984, 28

Ray R. Managemntul activităţilor sportive. În Buletin Informativ 499-501. Ed. CCPS, Bucureşti, 1997, 122-163

Schwarz P. Managementul organizaţiilor fără scop lucrativ. În Buletin informativ 529-531, Ed. CCPS, Bucureşti, 1997, 7-99

Soucie D. Eficienţa conducerii manageriale în oragnizaţiile sportive. În Buletinul Informativ 504-506. Ed. CCPS, Bucureşti, 1997, 1-3

Palestrica of the third millennium – Civilization and Sport
Vol. 13, no. 4, October-December 2012, 358–364

Constituirea noilor state independente şi evoluţia mişcării olimpice

The emergence of new states and the evolution of the Olympic movement

Ştefan Maroti
Facultatea de Geografie, Turism şi Sport, Universitatea din Oradea

Rezumat

Autorul lucrării şi-a propus să studieze evoluţia mişcării olimpice internaţionale de la începuturi şi până în zilele noastre, în raport cu o serie de condiţii şi evenimente care au avut ca rezultat schimbări majore pe harta politică a lumii, evidenţiate prin apariţia unor state, dispariţia sau modificarea teritoriului altora.

Prin conţinutul său, lucrarea prezintă interes pentru cei care sunt preocupaţi de studierea şi cunoaşterea mişcării olimpice internaţionale, a modului cum a evoluat aceasta ca rezultat al modificărilor survenite pe harta politică a lumii de-a lungul timpului.

Documentarea în vederea elaborării articolului s-a realizat prin studierea unor lucrări de drept internaţional, de geografie politică, istorie şi olimpism. De asemenea, am consultat lucrări, site-uri privind mişcarea olimpică, evoluţia acesteia de-a lungul celor peste 100 de ani de existenţă.

În prima parte, lucrarea abordează o seamă de aspecte conceptuale privind statul, independenţa ca parte a principiului egalităţii suverane, raportul dintre stat şi o seamă de organizaţii internaţionale.

În continuare, este prezentată situaţia statelor, caracteristicile şi particularităţile acestora, constituirea şi aderarea comitetelor naţionale la mişcarea olimpică. Constatând că în multe cazuri ale noilor state se poate stabili o relaţie directă între declararea independenţei şi aderarea comitetelor naţionale olimpice din cadrul acestora la mişcarea olimpică internaţională, lucrarea analizează modul în care o seamă de evenimente majore (cele două Războaie Mondiale, Războiul Rece, procesul de decolonizare, destrămarea unor state etc.) au influenţat constituirea noilor state naţionale, cum s-au reflectat ele asupra primirii acestora în familia olimpică, cum s-au răsfrânt ele asupra contribuţiei comitetelor naţionale olimpice ale acestor state, la promovarea olimpismului şi dezvoltarea mişcării olimpice.

Cuvinte cheie: stat, independenţă, mişcare olimpică.

Abstract

The author set out to study the evolution of the international Olympic movement from its beginnings until today in relation to a number of conditions and events that resulted in major changes on the world map, highlighted by the emergence of states, disappearance or territory changes of others.

Its content, the paper interests those who are concerned with the study and knowing the international Olympic movement and how it has evolved as a result of changes occurred on the world map over time.

Documentation to develop article was done by studying the works of international law, political geography, history and olympism. The author also consulted papers, sites on the Olympic movement, its evolution over more than 100 years of existance.

In the first part, the paper addresses a number of conceptual issues concerning state independence as part of the principle of sovereign equality, the relationship between state and several international organizations.

Further is presented the situation of states, characteristics and peculiarities, the constitution and adherence of national committees to the Olympic movement. Noting that in many cases a direct relationship between the new states' independence and the adherence of their national Olympic committees to the international Olympic movement can established, the paper examines how a number of major events (the two World Wars, the Cold War, decolonization process, disintegration of states, etc.) have influenced the creation of new nation states, as they reflected on their acceptance in the Olympic family, as they were reflected on the contribution of national Olympic committees of these countries to promote and develop Olympic movement.

Keywords: state, independence, Olympic movement.

Primit la redacţie: 3 August 2012; *Acceptat spre publicare:* 25 Septembrie 2012
Adresa: Universitatea din Oradea, Facultatea de Geografie, Turism şi Sport, Str. Universităţii, nr. 1-5, cod 410087, Oradea, Judeţul Bihor
E-mail: marotistefan@yahoo.com

Introducere

De-a lungul timpului, harta politică a lumii a suferit multiple influenţe şi prefaceri permanente. Acestea au fost determinate şi marcate de o mare diversitate de condiţii şi evenimente, care au avut ca rezultat apariţia unor state, dispariţia sau modificarea teritoriului altora.

Statul reprezintă un fenomen social complex, o instituţie fundamentală, principala formă de organizare socială având concretizată autoritatea puterii (Mazilu, 1972). Principalele atribute ale statului sunt reprezentate de autoritatea guvernamentală independentă şi prerogativele puterii, pe un anumit teritoriu şi asupra unei populaţii stabile (Niri, 1975).

Egalitatea suverană este unul dintre principiile fundamentale ale dreptului internaţional referitor la relaţiile dintre state. Printre elementele principiului egalităţii suverane se numără independenţa de stat. Independenţa conferă statului dreptul de a stabili şi conduce în mod liber relaţiile sale cu celelalte state, de a participa sau nu la tratate, de a fi sau nu membru al organizaţiilor internaţionale, de a fi sau a nu fi membru al alianţelor, ca şi dreptul la neutralitate (Diaconu, 1995). Dreptul internaţional contemporan consfinţeşte dreptul popoarelor de a se constitui în state independente. Cele mai importante documente în care sunt reglementate principiile fundamentale ale dreptului internaţional privind statele şi relaţiile dintre ele sunt: Declaraţia de la Bandung din anul 1955, Carta Organizaţiei Naţiunilor Unite, adoptată în anul 1945 la San Francisco, Rezoluţia Adunării Generale a Organizaţiei Naţiunilor Unite nr. 2625 (XXV) din 24 octombrie 1970, Declaraţia referitoare la principiile dreptului internaţional privind relaţiile prieteneşti şi cooperarea între state, Declaraţia semnată la Conferinţa pentru Securitate şi Cooperare în Europa, Helsinki 1975 etc. (Popescu şi Năstase, 1986).

Apariţia noilor state independente a avut influenţe multiple şi majore asupra raportului de forţe pe plan mondial, asupra evoluţiei dreptului internaţional, asupra sistemului de organizaţii internaţionale şi activităţii acestora. Chiar dacă mişcarea olimpică, conform prevederilor Cartei olimpice, trebuie ferită de ingerinţele politice, activitatea sa este influenţată de modul în care statele îşi exercită atribuţiile legate de relaţiile cu diferite organizaţii.

Creşterea numărului de noi state şi masiva admitere a lor în familia olimpică a contribuit la întărirea mişcării olimpice, la dezvoltarea acesteia, la orientarea într-o măsură mai mare a Comitetului Internaţional Olimpic în direcţia aplicării, îndeplinirii şi valorificării principiilor şi scopurilor înscrise în Carta olimpică.

Evoluţia hărţii politice a lumii înainte de constituirea şi în primii ani de activitate ai Comitetului Internaţional Olimpic

În anii de dinaintea constituirii Comitetului Internaţional Olimpic, revoluţiile de la mijlocul secolului XIX, care au cuprins o mare parte a Europei, au redeşteptat cu şi mai mare vigoare lupta popoarelor pentru înfăptuirea statelor naţionale. Ca efect al acestora, evenimentele din a doua jumătate a secolului XIX au animat puternic procesul formării şi consolidării statelor naţionale moderne. În această perioadă, noile state independente din America de Sud şi-au consolidat independenţa. În Europa s-a destrămat Sfânta Alianţă, a avut loc unirea Principatelor Române, s-a realizat unificarea Italiei şi Germaniei.

Consolidarea revoluţiei industriale în cele mai puternice state ale lumii din acea perioadă, Anglia, Statele Unite ale Americii, Franţa şi Germania, a determinat trecerea acestora într-o nouă fază de dezvoltare, capitalismul monopolist. Ca rezultat al concentrării producţiei şi a capitalurilor, formarea oligarhiei financiare, exportul de capital, crearea uniunilor monopoliste internaţionale au generat expansiunea colonială a marilor puteri (Giurcăneanu, 1983). Colonialismul a însemnat ocuparea unor teritorii prin forţa armată, lipsirea de libertate a populaţiei acestora, împiedicarea afirmării lor şi a constituirii statelor naţionale. În multe situaţii, prin deciziile Conferinţei de pace de la Berlin, din noiembrie 1884 şi, apoi, ale Conferinţei de pace de la Paris din anul 1919, interesele puterilor coloniale au condus la divizarea unor popoare aparţinând aceleaşi limbi şi culturi, la separarea unor populaţii având aceeaşi origine etnică şi la anexarea lor la entităţi politice şi teritoriale alături de populaţii diferite din aceste puncte de vedere (Botoran, 1972).

În ultimii ani ai secolului XIX şi primii ani ai secolului XX, pe plan internaţional au intervenit o seamă de schimbări care şi-au pus amprenta asupra constituirii Comitetului Internaţional Olimpic şi activităţii din primii ani ai mişcării olimpice. În această perioadă, în Europa erau douăzeci şi cinci de state independente, au dispărut micile republici şi ducate ca rezultat al formării statelor unitare mari, printre care s-au numărat Germania şi Italia. În America, alături de Statele Unite ale Americii şi Canada, care avea statut de dominion al Marii Britanii, erau în plin proces de consolidare douăzeci de state, care s-au născut pe ruinele imperiului colonial spaniol. Marea majoritate a teritoriului Asiei, Africii şi Oceaniei făcea parte din imperiile coloniale (Lungu, 2006).

Faptul că în momentul înfiinţării Comitetului Internaţional Olimpic şi în primii ani de activitate a acestuia pe harta lumii erau patruzeci şi opt de state independente (Matei ş.c., 1995), dintre care multe se aflau abia la începutul existenţei lor, unele erau slab dezvoltate şi în care mişcarea sportivă era aproape inexistentă, au făcut ca în primii douăzeci şi cinci de ani numărul comitetelor naţionale olimpice constituite şi care să solicite aderarea la mişcarea olimpică să fie destul de mic, douăzeci şi două. În acest interval de timp, în afară de acestea, mai activau în mişcarea olimpică comitete naţionale, precum Africa de Sud, Cuba, Haiti, India, Islanda, Rusia care au participat la Jocurile Olimpice, dar care nu au solicitat recunoaşterea oficială (3).

Faptul că în momentul admiterii în mişcarea olimpică Boemia era domeniu ereditar al familiei domnitoare din Austria, că Finlanda era încorporată ca ducat autonom în Rusia, că Norvegia aparţinea Suediei ca urmare a uniunii personale semnate în cadrul Tratatului de Kiel, că Egiptul era provincie otomană, că Africa de Sud, Australia şi Noua Zeelandă aveau statute speciale în cadrul Imperiului Britanic, iar Canada era dominion britanic demonstrează că, încă de la începuturile existenţei sale, familia olimpică a admis în rândurile sale comitete naţionale din ţări independente, din teritorii sau regiuni geografice

care îşi exercitau activitatea conform regulamentelor şi înaltului ideal al mişcării olimpice (***, 2007). De la începuturile sale, în eforturile de a răspunde principiului universalităţii, Comitetul Internaţional Olimpic s-a dovedit a fi o organizaţie deschisă, iar procesul de admitere a noilor membri a constituit o condiţie esenţială pentru ca mişcarea olimpică să reflecte situaţia realităţilor internaţionale şi, în acelaşi timp, să răspundă cu eficienţă practică la înfăptuirea scopurilor sale.

Tabelul I

Comitetele naţionale olimpice (CNO) din perioada 1894-1915 şi statutul statelor, teritoriilor şi regiunilor în care îşi desfăşurau activitatea în momentul constituirii.

Nr. crt.	Ţara, teritoriul sau regiunea		Anul constituirii CNO
	Denumirea	Statutul în acea perioadă	
1	Africa de Sud	Colonie britanică	1908
2	Australia	Colonie britanică	1895
3	Austria	Stat independent	1908
4	Belgia	Stat independent	1906
5	Brazilia	Stat independent	1914
6	Canada	Dominion britanic	1904
7	Boemia	Domeniu ereditar al familiei de Habsburg	1891
8	China	Stat independent	1910
9	Danemarca	Stat independent	1905
10	Egipt	Provincie otomană	1910
11	Elveţia	Stat independent	1912
12	Filipine	Posesiune a SUA	1911
13	Finlanda	Ducat autonom în cadrul Rusiei	1907
14	Franţa	Stat independent	1894
15	Germania	Stat independent	1895
16	Grecia	Stat independent	1894
17	Haiti	Stat independent	1914
18	Italia	Stat independent	1908
19	Japonia	Stat independent	1911
20	Luxemburg	Stat independent	1912
21	Marea Britanie	Stat independent	1905
22	Monaco	Protectorat al Franţei	1907
23	Norvegia	Uniune personală cu Suedia	1900
24	Noua Zeelandă	Colonie britanică	1911
25	Olanda	Stat independent	1912
26	Portugalia	Stat independent	1909
27	România	Stat independent	1914
28	Spania	Stat independent	1912
29	SUA	Stat independent	1894
30	Suedia	Stat independent	1913
31	Turcia	Stat independent	1908
32	Ungaria	Stat independent	1895

Realizat pe baza datelor din Bârsan (1975) şi National Olympic Committee (3).

Mişcarea olimpică între cele două războaie mondiale

Evenimentele de după Primul Război Mondial au condus la o serie de transformări majore pe harta politică a lumii: apariţia noului stat sovietic, destrămarea Imperiului Austro-Ungar, declararea independenţei ţărilor baltice şi a altor ţări din Europa, crearea României Mari, dislocarea Imperiului Otoman, cucerirea independenţei Mongoliei. În urma Păcii de la Versailles, din anul 1919, s-a creat Pactul Societăţii Naţiunilor, organizaţie cu vocaţie universală, care şi-a propus să furnizeze garanţii reciproce de independenţă politică şi teritorială atât statelor mici, cât şi celor mari (Sofronie, 1927). Cu toate că, în Mesajul său în paisprezece puncte, adresat la 18 ianuarie 1918, preşedintele Statelor Unite ale Americii, Thomas Woodrow Wilson, proclamase dreptul popoarelor la autodeterminare (Bolintineanu şi Maliţa, 1970), sfârşitul Primului Război Mondial nu a adus prea multe modificări în statutul posesiunilor coloniale, exceptând teritoriile care s-au aflat sub stăpânirea otomană şi fostele colonii germane. La propunerea primului ministru al Africii de Sud, generalul Jan Christiaan Smuts, asupra acestora s-a instituit sistemul mandatelor internaţionale, care, însă, nu au adus nici o modificare de fond în structura imperiilor coloniale

În urma Conferinţei Imperiale de la Londra din anul 1923, ca rezultat al adoptării Statutului de la Westminster dominioanele şi-au câştigat autonomia. Prin constituirea, în anul 1926, a Commonwealth-ului, între comunitatea teritoriilor din cadrul Imperiului Britanic şi metropolă s-a realizat o formă de asociere şi colaborare (1).

Analiza hărţii politice a lumii din perioada dintre cele două războaie mondiale ne conduce la constatarea că statele independente erau grupate, mai cu seamă, în Europa şi America, că o mare parte a Africii, Asiei şi Oceaniei se afla, pe mai departe, sub dominaţie colonială.

Tabelul II

Comitetele naţionale olimpice constituite în perioada 1918-1945.

Nr. crt.	Statul/teritoriul	Anul dobândirii independenţei de stat	Anul constituirii CNO	Anul recunoaşterii de către CIO
1	Polonia	11 nov 1918	1918	1919
2	Regatul Sârbilor, Croaţilor şi Slovenilor*	1 dec 1918	1919	1920
3	*Islanda*	17 iun 1944	1921	1935
4	Irlanda	21 ian 1919	1922	1922
5	Letonia	18 nov 1918	1922	1991
6	Argentina	9 iul 1816	1923	1923
7	Mexic	24 feb 1821	1923	1923
8	Uruguay	25 aug 1825	1923	1923
9	Bulgaria	5 oct 1908	1923	1924
10	Estonia	24 feb 1918	1923	1991
11	Lituania	16 feb 1918	1924	1991
12	Peru	28 iul 1821	1924	1936
13	Cuba	10 feb 1898	1926	1954
14	*India*	15 aug 1947	1927	1927
15	*Malta*	23 dec 1974	1928	1936
16	*Antilele Olandeze*	Terit. autonom	1931	1931
17	Bolivia	6 aug 1925	1932	1936
18	*Israel*	14 mai 1948	1933	1952
19	Chile	12 feb 1812	1934	1934
20	Panama	3 nov 1903	1934	1947
21	*Rhodesia de Sud***	18 apr 1980	1934	1980
22	Afganistan	18 feb 1919	1935	1936
23	*Bermude*	Terit. autonom	1935	1936
24	*Guyana*	26 mai 1966	1935	1948
25	Lichtenstein	1866	1935	1935
26	Venezuela	5 iul 1811	1935	1935
27	Columbia	20 iul 1810	1936	1939
28	*Jamaica*	6 aug 1962	1936	1936
29	*Ceylon****	4 feb 1948	1937	1937

Realizat pe baza datelor din Lacoste (1995) şi National Olympic Committee (3).
*Din 3 octombrie 1929 Iugoslavia
** Din 18 aprilie 1980 Zimbabwe
*** Din anul 1972 Sri Lanka

După Primul Război Mondial mişcarea olimpică s-a lărgit cu comitetele naţionale olimpice aparţinând unor state independente din America de Sud (Argentina, Uruguay, Peru, Bolivia, Chile, Venezuela, Columbia) America Centrală (Mexic, Cuba şi Panama), cu cele rezultate în urma destrămării Imperiului Austro-Ungar (Austria, Ungaria, Cehoslovacia, Regatul Sârbilor, Croaţilor şi Slovenilor) şi ale altor state care şi-au declarat independenţa (Polonia, Finlanda, Letonia, Lituania şi Estonia).

Ca expresie a schimbării opticii unor metropole, mai cu seamă Marea Britanie, s-a ajuns la situaţia ca în această perioadă în familia olimpică să fie admise comitete naţionale olimpice provenite din teritorii aflate sub dominaţie colonială, Antilele Olandeze, Bermude, Guyana Engleză, India, Islanda, Israel, Jamaica, Malta, Ceylon şi Rhodesia de Sud.

În aceste condiţii, din cele douăzeci şi nouă de comitete naţionale olimpice care s-au alăturat familiei olimpice între anii 1919-1945, unsprezece erau constituite în Europa, opt în America de Sud, şase în America Centrală, trei în Asia şi unul în Africa. Pe mai departe, centrul de greutate al mişcării olimpice era în Europa, cu treizeci şi două de comitete naţionale olimpice şi în America, cu optsprezece comitete naţionale olimpice. Celelalte comitete naţionale olimpice erau în Asia - şase, Africa - trei şi Oceania - două.

Perioada dintre 1945 – 1989

După al Doilea Război Mondial, prin apariţia statelor comuniste în Estul Europei şi în Asia, prin declararea independenţei a numeroase foste colonii s-a schimbat raportul de forţe pe plan mondial. Divergenţele apărute în relaţiile dintre marile puteri ale lumii, Satele Unite ale Americii şi Uniunea Sovietică, au condus la divizarea unei mari părţi a statelor în blocuri ideologice şi militare potrivnice, la declanşarea Războiului Rece, care s-au răsfrânt şi asupra mişcării olimpice. În perioada Războiului Rece, noile state s-au situat, în funcţie de opţiunile lor ideologice, unele de partea Statelor Unite ale Americii, altele de partea Uniunii Sovietice, iar altă parte a lor s-a alăturat mişcării statelor nealiniate (Seftiuc, 1980).

Întregul complex de condiţii din anii Războiului Rece a determinat ca factorii de conducere ai mişcării olimpice internaţionale, în ciuda prevederilor Cartei, să facă unele concesii politicului. Comitetele naţionale olimpice din ţările socialiste şi din unele ţări nealiniate au generat neînţelegeri cu ceilalţi membri, privind unele bariere în ceea ce priveşte limitele politice în mişcarea olimpică. De asemenea, până în anul 1970, ele au făcut presiuni şi, în mare măsură, au reuşit politizarea alegerii membrilor Comitetului Exeutiv al Comitetului Internaţional Olimpic.

Divizarea unor state, în mod deosebit a Germaniei, şi desprinderea unor regiuni din componenţa unor ţări, mai cu seamă a Taiwanului de Republica Populară Chineză, au creat probleme privind succesiunea în mişcarea olimpică şi recunoaşterea noilor comitete naţionale olimpice.

Dacă recunoaşterea Comitetului Olimpic din Republica Federală Germană s-a soluţionat relativ repede şi uşor, încă în anul 1951, problema recunoaşterii Comitetului Olimpic din Republica Democrată Germană s-a realizat pas cu pas, în acord cu schimbările în relaţiile politice din acea perioadă. Astfel, reglementarea deplină a acestei probleme s-a finalizat în cadrul Sesiunii Comitetului Internaţional Olimpic de la Mexico City, 7-11 octombrie 1968 (Stauffer, 1999).

Problema „celor două Chine" şi-a pus amprenta asupra mişcării olimpice pentru mai bine de două decenii. Recunoaşterea reprezentării legitime a poporului chinez în organizaţiile internaţionale s-a repercutat şi în plan sportiv. Manevrele procedurale care urmăreau amânarea soluţionării reprezentării Republicii Populare Chineze în mişcarea olimpică, neînţelegerile dintre Comitetul Olimpic al Republicii Democrate a Chinei (schimbare de denumire produsă în anul 1957) şi reprezentanţii forului internaţional olimpic au determinat adresarea, la 19 august 1958, a unei scrisori a Federaţiei Sporturilor din Întreaga Chină, semnată de către Shou Titung, preşedintele acestui for, prin care se comunica întreruperea relaţiilor cu Comitetul Internaţional Olimpic şi retragerea din federaţiile sportive internaţionale, decizii care au devenit efective începând cu 1 ianuarie 1959. Această stare de lucruri a creat o situaţie care a dăinuit până la 29 octombrie 1979. În cadrul întâlnirii ţinute la Nagoya, Comitetul Executiv al Comitetului Internaţional Olimpic a elaborat o rezoluţie, aprobată cu şaizeci şi două de voturi pentru, şaptesprezece împotrivă şi două abţineri, prin care s-a confirmat Comitetul Olimpic din Republica Populară Chineză ca reprezentant al întregii Chine în mişcarea olimpică. De asemenea, s-a decis menţinerea în mişcarea olimpică a Comitetului Olimpic din Taiwan cu statut de organizaţie locală în cadrul Chinei, având denumirea de Comitetul Olimpic al Taipeiului Chinezesc, cu imn, steag şi emblemă diferite de cele utilizate până atunci (4).

Fig. 1 – Comitetele naţionale olimpice recunoscute de către Comitetul Internaţional Olimpic în perioadea 1945-1989. Realizat pe baza List of National Olympic Committee`s by recognition date (2).

O altă caracteristică a perioadei de după cel de al Doilea Război Mondial a fost manifestarea cu tărie a voinţei a unei mari părţi a comunităţii internaţionale pentru eliminarea oricărei forme de dependenţă colonială şi de a impune destrămarea imperiilor coloniale. Acţiunile privind dobândirea independenţei de stat a popoarelor aflate sub dominaţie colonială s-a manifestat atât prin acţiuni politice, cât şi prin lupta armată. Acest proces a fost susţinut în plan politic atât de acţiunile conducătorilor politici şi ale populaţiei din teritoriile respective, cât şi la nivelul organizaţiilor internaţionale, mai ales Organizaţia Naţiunilor Unite. Cu toate că statele deţinătoare de colonii au încercat diferite manevre pentru păstrarea posesiunilor coloniale – treceri ale teritoriilor aflate sub mandat în tutelă internaţională, remodelări ale structurii imperiilor coloniale prin formarea de uniuni între metropolă şi colonii – decolonizarea s-a realizat rapid.

Conferinţa de la Bandung, din aprilie 1955, a deschis drumul decolonizării accelerate. Prin adoptarea, la 14 decembrie 1960, în cadrul Adunării Generale a

Organizaţiei Naţiunilor Unite, a Rezoluţiei nr. 1514 (XV) care cuprinde Declaraţia pentru acordarea independenţei ţărilor şi popoarelor coloniale, s-a dat un puternic imbold procesului de decolonizare. Astfel, în perioada 1945-1989 pe harta politică a lumii au apărut nouăzeci şi şapte de noi state ca urmare a câştigării independenţei (Lacoste, 1995). În acest interval de timp, familia olimpică s-a lărgit cu o sută douăzeci de noi membri (3).

După dobândirea statutului de membru al mişcării olimpice internaţionale, comitetele naţionale olimpice din aceste ţări au avut evoluţii diferite, determinate de tradiţiile şi specificul fiecăruia, de poziţia autorităţilor guvernamentale faţă de mişcarea sportivă, în general, şi cea olimpică, în mod special, de nivelul de dezvoltare a sportului, de influenţele străine care au acţionat asupra lor etc. Chiar dacă în o serie de teritorii sportul, atât sub aspectul infrastructurii şi al sistemului competiţional, inclusiv participarea la Jocurile Olimpice, cât şi a rezultatelor, a cunoscut o dezvoltare încă din perioada colonială, în multe foste colonii, în momentul obţinerii independenţei, nu se putea vorbi despre sport în accepţiunea modernă a sa şi nu exista o mişcare olimpică naţională. O caracteristică a activităţii sportive în multe din noile state a fost că mişcarea olimpică s-a format şi s-a dezvoltat în paralel cu lupta de eliberare naţională şi întărirea independenţei de stat. În multe din noile state, apartenenţa la mişcarea olimpică, participarea la Jocurile Olimpice, rezultatele sportivilor au fost utilizate pentru mobilizarea maselor, ca mijloc de formare a conştiinţei naţionale, ca un liant pentru realizarea şi dezvoltarea unităţii naţionale, ca instrument de propagandă, ca modalitate de afirmare a valorilor naţionale şi de proiectare a imaginii ţării pe plan internaţional (Kun, 1984).

La sfârşitul anilor `50 şi începutul anilor `60, aderarea unui mare număr de comitete naţionale olimpice din noile state independente a generat o seamă de schimbări în structura mişcării olimpice. Ca membri ai familiei olimpice, reprezentanţii acestora au întreprins numeroase acţiuni în vederea democratizării Comitetului Internaţional Olimpic şi sprijinirea activităţii mişcării olimpice din ţările nou constituite. Prin iniţiativele şi acţiunile lor, noile state au luat parte activă la creşterea rolului comitetelor naţionale olimpice din aceste ţări. Ca o consecinţă a acţiunilor de modernizare şi democratizare a mişcării olimpice iniţiate de noile state, a devenit o practică obişnuită consultarea operativă dintre Comitetul Internaţional Olimpic, comitetele naţionale olimpice şi federaţiile sportive internaţionale în probleme de importanţă privind Jocurile Olimpice, precum şi în cele ce vizează pregătirea congreselor olimpice (Şiperco, 1976).

Conducătorii sportivi din noile state, la propunerea preşedintelui Indoneziei, Ahmed Sukarno, au participat activ la iniţierea şi sprijinirea Jocurile Forţelor Progresiste (GANEFO), competiţie cu o puternică coloratură politică, menită, în opinia iniţiatorilor ei, să concureze şi, în perspectivă, să înlocuiască Jocurile Olimpice. Chiar dacă prima ediţie, desfăşurată la Jakarta, între 10 – 22 noiembrie 1963, s-a bucurat de participarea a două mii şapte sute de sportivi din cincizeci şi una de ţări, Jocurile Forţelor Progresiste s-au lovit de opoziţia Comitetului Internaţional Olimpic, de împotrivirea majorităţii federaţiilor sportive internaţionale, dar şi de poziţia fermă a unui număr însemnat de comitete naţionale olimpice, care au interzis membrilor săi să ia parte la acestea. În acest fel, ediţia a doua, disputată între 25 noiembrie - 6 decembrie 1967, la Phnom Penh, a avut o participare redusă, iar cea de a treia ediţie, planificată a se desfăşura la Beijing, în anul 1970, nu a mai avut loc. Analizându-se cauzele care au condus la apariţia Jocurilor Forţelor Progresiste, a influenţelor acestora asupra mişcării olimpice, în cadrul şedinţei Comisiei Executive a Comitetului Internaţional Olimpic, ţinută la 22 octombrie 1966, la Mexico City, s-a apreciat că acestea au reprezentat o serioasă ameninţare la adresa mişcării olimpice (Espy, 1979).

Începând cu anul 1965, acţiunile unui număr însemnat de comitete naţionale olimpice, în mod deosebit a celor provenind din tinerele state independente, au generat o perioadă frământată, de criză, în relaţiile cu Comitetul Internaţional Olimpic, determinată de solicitările acestora de a obţine un sprijin mai mare din partea forului internaţional de conducere pentru dezvoltarea mişcării olimpice din noile state. O serie de măsuri organizatorice şi îmbunătăţirea situaţiei financiare a mişcării olimpice ca urmare a creşterii sumelor încasate din acţiunile de marketing şi drepturile de televizare a Jocurilor Olimpice, s-au putut derula acţiuni coerente şi eficiente de asistenţă a comitetelor naţionale olimpice. Prin constituirea Fondului de solidaritate olimpică, având ca buget o treime din totalul sumelor încasate de Comitetul Internaţional Olimpic din drepturile de televizare, s-au deschis numeroase oportunităţi pentru sprijinirea comitetelor naţionale olimpice mai sărace, sub formă de servicii în domenii ca organizarea generală a sportului, pregătirea specialiştilor, dezvoltarea infrastructurii sportive, organizarea documentării în domeniul olimpismului etc. Aceste realizări au dat posibilitatea ca în anul 1972, cu ocazia Jocurilor Olimpice de la München, preşedintele forului internaţional olimpic, lordul Kilanin, să declare că se poate considera că Comitetul Internaţional Olimpic a depăşit definitiv momentele de criză (Şiperco, 1976).

Federaţiile sportive şi comitetele naţionale olimpice din noile state, mai cu seamă cele din Africa, s-au alăturat eforturilor Comitetului Internaţional Olimpic, ale majorităţii federaţiilor sportive internaţionale şi ale altor organizaţii sportive internaţionale şi au acţionat pentru izolarea şi sancţionarea organizaţiilor sportive din Africa de Sud pentru practicile discriminatorii faţă de populaţia de culoare din această ţară. Acţiunea cea mai fermă şi cea mai cunoscută dusă de statele africane împotriva practicilor rasiale ale Africii de Sud a fost cea din 1976, când la chemarea preşedintelui Tanzaniei, Julius Nyerere, douăzeci şi şase de guverne africane, cărora li s-au alăturat Irakul şi Guyana, au interzis sportivilor lor să ia parte la Jocurile Olimpice de la Montreal, 1976 (Wallechinsky, 1996).

După anul 1989

Evenimentele politice majore şi radicalele transformări petrecute după 1989 au modificat o mare parte a hărţii politice a lumii. Acestea au condus la schimbări importante şi în mişcarea olimpică.

După căderea Zidului Berlinului şi unificarea Germaniei s-a desfiinţat Comitetul Olimpic din Republica

Democrată Germană. În urma destrămării Uniunii Sovietice, Rusia a devenit succesoarea acesteia în mişcarea olimpică. În ţările baltice s-au reînfiinţat comitetele naţionale olimpice din Estonia, Letonia şi Lituania, iar în celelalte state desprinse au apărut unsprezece noi comitete naţionale olimpice, Armenia, Azerbaidjan, Belarus, Georgia, Kazahstan, Kirghistan, Moldova, Tadjikistan, Turkmenistan, Ukraina şi Uzbekistan. Prin separarea Cehoslovaciei în două state, s-a reânfiinţat Comitetul Olimpic din Republica Cehă, care a devenit succesoarea Cehoslovaciei în familia olimpică, şi a luat fiinţă Comitetul olimpic din Slovacia. În urma destrămării Iugoslaviei, familia olimpică internaţională a crescut prin constituirea unor noi comitete naţionale olimpice, Bosnia şi Herţegovina, Croaţia, Macedonia, Muntenegru, Slovenia şi Serbia, care este considerată succesoare a Iugoslaviei din punctul de vedere al mişcării olimpice (3).

După 1990, Africa de Sud şi-a reluat locul în mişcarea olimpică. La sugestia comisiei Comitetului Internaţional Olimpic condusă de Keba M`Baye, noile state, mai ales cele din Africa, au avut un rol important în sprijinirea acţiunilor pentru ca Comitetul Olimpic din Africa de Sud să-şi ocupe locul în familia olimpică, pentru ca federaţiilor sportive sud africane să fie reprimite în organismele sportive internaţionale, pentru ca o seamă de personalităţi ale sportului sud african să fie alese în organele de conducere ale structurilor sportive internaţionale etc. (Hill, 1976).

De asemenea, mişcarea olimpică internaţională s-a îmbogăţit prin constituirea şi aderarea altor nouăsprezece noi comitete naţionale olimpice, precum Namibia, Burundi, Capul Verde, Comore, Dominica, Saint Kitts şi Nevis, Santa Lucia, São Tomé şi Príncipe, Cambodgea, Nauru, Guinea-Bissau, Palestina, Statul Federal Micronesia, Eritrea, Palau, Kiribati, Timorul de Est, Insulele Marshall şi Tuvalu (2).

Concluzii

1. La Congresul de la Sorbona, din 1894, Pierre de Coubertin şi colaboratorii săi au conceput Comitetul Internaţional Olimpic ca o organizaţie cu vocaţie de universalitate. În cei peste o sută de ani ai existenţei sale, aceasta s-a dovedit a fi o organizaţie deschisă, iar procesul de admitere a noilor membri a constituit o condiţie esenţială pentru ca mişcarea olimpică să reflecte situaţia realităţilor internaţionale şi, în acelaşi timp, să răspundă cu eficienţă practică pentru înfăptuirea scopurilor sale.

2. Deschiderea Comitetului Internaţional Olimpic s-a manifestat încă din primii ani ai existenţei sale prin admiterea în mişcarea olimpică a comitetelor naţionale olimpice care proveneau atât din state independente, dar şi din teritorii şi regiuni dependente sau cu un anumit grad de autonomie, dar care se conformau regulilor şi îşi desfăşurau activitatea în concordanţă cu înaltul ideal al mişcării olimpice.

3. Numărul mic de state independente la acea dată şi nivelul scăzut de dezvoltare a sportului în multe dintre acestea, au făcut ca în primul sfert de veac al existenţei mişcării olimpice numărul comitetelor naţionale olimpice recunoscute de către Comitetul Internaţional Olimpic să fie de numai douăzeci şi două. În această perioadă, alături de acestea erau constituite comitete naţionale olimpice care încă nu erau recunoscute, dar şi comitete naţionale olimpice a căror sportivi au participat la Jocurile Olimpice, dar nu au solicitat o recunoaştere oficială.

4. În perioada dintre cele două războaie mondiale, mişcarea olimpică s-a lărgit cu douăzeci şi nouă comitete naţionale olimpice. Majoritatea acestora proveneau din ţările Americii de Sud şi state care şi-au câştigat independenţa după Primul Război Mondial. Schimbările intervenite în relaţiile dintre unele metropole şi coloniile lor, au avut ca rezultat acceptarea în familia olimpică a zece comitete naţionale olimpice provenite din teritorii aflate sub dominaţie colonială.

5. După al Doilea Război Mondial, se observă că pentru majoritatea ţărilor nou apărute, constituirea comitetelor naţionale olimpice şi recunoaşterea lor de către Comitetul Internaţional Olimpic este legată de obţinerea independenţei de stat. Istoria perioadei cuprinsă între 1945 -1989 a consemnat apariţia pe harta politică a lumii a nouăzeci şi şapte de noi state şi lărgirea familiei olimpice cu o sută douăzeci de noi membri.

6. Apariţia statelor comuniste în Europa de Est şi Asia, aderarea multor ţări ale lumii la blocuri ideologice şi militare potrivnice, declanşarea Războiului Rece s-au răsfrânt şi asupra activităţii Comitetului Internaţional Olimpic. Confruntările dintre cele două tabere au generat neînţelegeri între membri privind limitele politice în cadrul mişcării olimpice. De asemenea, s-a ajuns ca, pentru o perioadă de aproximativ două decenii, alegerea membrilor Comisiei Executive a Comitetului Internaţional Olimpic să fie politizată.

Tabelul III

Comitetele naţionale olimpice constituite şi recunoscute în perioada 1990-2011.

Anul	Continentul				
	Africa	America	Asia	Europa	Oceania
1991	Namibia, Africa de Sud			Estonia, Letonia, Lituania	
1992					
1993	Burundi, Capul Verde, Comore, Sao Tome şi Principe	Dominica, Saint Kitts şi Nevis, Santa Lucia	Armenia, Azerbaijan, Georgia, Kazahstan, Kirgistan, Tadjikistan, Turkmenistan	Belarus, Bosnia şi Herţegovina, Croaţia, Republica Cehă, Moldova, Macedonia, Rusia, Slovacia, Slovenia, Ucraina, Uzbekistan	
1994			Cambodgea,		Nauru
1995	Guineea Bissau		Palestina		
1997					Micronezia
1999	Eritrea				Palau
2003			Timorul de Est		Kiribati
2006					I-le Marshall
2008				Muntenegru	Tuvalu

Realizat pe baza List of National Olympic Committee`s by recognition date (2).

7. În multe din noile state, mai ales în cele din Africa, dar şi din Asia şi Oceania, mişcarea olimpică s-a format în paralel cu procesul de eliberare naţională şi întărirea independenţei de stat.

8. Cu toate frământările şi situaţiile de criză pe care le-au generat, noile state au jucat un rol important în procesul de democratizare şi modernizare a mişcării olimpice.

9. Căutările Comitetul Internaţional Olimpic ce au vizat optimizarea sprijinirii comitetelor naţionale olimpice nou apărute şi creşterea puterii financiare a forului conducător al mişcării olimpice în urma sporirii veniturilor din concesionarea drepturilor de televizare a Jocurilor Olimpice au condus la constituirea Comisiei de solidaritate olimpică. Prin intermediul acesteia, s-au iniţiat şi derulat numeroase şi variate acţiuni de sprijinire a comitetelor naţionale olimpice mai sărace. Acestea au luat forma unor servicii privind organizarea sportului, în general, a mişcării olimpice, în special, pregătirea sportivilor, formarea şi perfecţionarea specialiştilor, dezvoltarea infrastructurii, organizarea cercetării olimpismului etc.

10. Evenimentele de după anul 1989, care au condus la mari prefaceri pe harta politică a lumii, au avut influenţe şi asupra mişcării olimpice, concretizate prin desfiinţarea Comitetului Olimpic din Republica Democrată Germană, prin reînfiinţarea a patru comitete naţionale olimpice în state din Europa de Est, prin reintegrarea Africii de Sud în mişcarea olimpică, prin apariţia a optsprezece comitete naţionale olimpice ca urmare a destrămării Uniunii Sovietice şi divizării Iugoslaviei. De asemenea, în intervalul 1990 - 2011, au aderat la mişcarea olimpică nouăsprezece noi membri provenind din state care şi-au cucerit independenţa sau din teritorii autonome.

Conflicte de interese

Nimic de semnalat.

Bibliografie

Bârsan A. Mic atlas geografic. Ed. Ştiinţifică. Bucureşti, 1967.

Bolintineanu A, Maliţa M. Carta ONU. Document al erei noastre. Ed. Politică, Bucureşti, 1970.

Botoran C. Aspecte ale procesului de formare a naţiunilor în Africa. În: Lumea. 1972; 430(4):16-18.

Diaconu I. Statele, ca subiect de drept internaţional. În: Drept internaţional public. Ed. a II-a revăzută şi adăugită. Ed. Casa de Editură şi Presă Şansa SRL. Bucureşti, 1995.

Espy R. The Politics of the Olympic Games. University of Califorinia Press, Berkeley, Los Angeles. London: 1979, 109.

Giurcăneanu C. Statele de pe harta lumii. Ed. Politică. Bucureşti, 1983.

Hill RC. Olympic Politics. Athens to Atlanta, 1896-1996. Sec. ed. Manchester University Press, Manchester and New York, 1996.

Kun L. Egyetemestestnevelés és sporttőrténet, Testnevelési Főiskolai Tankőnyv. Budapest, 1984, 324-328.

Lacoste Y (coord.). Dictionaire de géopolitique, Ed. Flamarion, Paris, 1995.

Lungu M. Statele lumii. Antologie. Ed. Steaua Nordului, Constanţa, 2006.

Matei HC, Negruţ S, Nicolae I, Şteflea N. Statele lumii. Mică enciclopedie. Ed a VI-a. Ed. Meronia. Bucureşti, 1995.

Mazilu DI. Funcţiile statului socialist. Ed. Acad RSR. Bucureşti, 1972.

Niri C (coord.). Dicţionar politic. Ed. Politică. Bucureşti, 1975.

Popescu D, Năstase A. (coord.) Sistemul principiilor dreptului internaţional. Ed. Academiei. Bucureşti, 1986.

Seftiuc IC. Ţările în curs de dezvoltare şi rolul lor în evoluţia vieţii internaţionale contemporane. În: Probleme internaţionale. Ed. Politică. Bucureşti, 1980.

Sofronie G. Contribuţii la cunoaşterea Societăţii Naţiunilor. Bucureşti, 1927.

Stauffer P. The olympic movement as an example of the interdependence between sport and politics, Paper presented at the 7th International Postgraduate Seminar on Olympic Studies. Ed. International Olympic Academy. Olympia, 1999.

Şiperco A. Olimpismul. Mişcarea olimpică. Jocurile Olimpice. Ed. Sprt-Turism, Bucureşti, 1976, 29-60.

Wallechinsky D. Politics in the Olympics. În: The Complete Book of the Summer Olympics. Little, Brown and Company. Boston, New York, Toronto, London, 1996.

***. Olympic Charter. Published by the International Olympic Committee. Lausanne, 2007.

Website-uri vizitate

(1) Commonwealth of Nations, http://en.wikipedia.org/wiki/Commonwealth_of_Nations, vizitat la 25.06.2012

(2 List of National Olympic Committee`s_by_recognition_date http://en.wikipedia.org/wiki/National_Olympic_Committee#, vizitat la 24 iunie 2012

(3) National Olympic Committee, http://en.wikipedia.org/wiki/National_Olympic_Committee, vizitat la 23.01.2011

(4) Tzuleong C. "Chinese Taipei' charade is vile", http://taiwantt.org.tw/taipeitimes/2004/08/20040817.htm, vizitat la 17.09.2004

RECENT PUBLICATIONS
ACTUALITĂŢI EDITORIALE

New Romanian publications in the field of sports
Publicaţii româneşti recente în domeniul sportului

Psihologia sportului pentru antrenori
Marius Crăciun
Editura Risoprint, Cluj-Napoca, 2012
229 pagini

Pe lângă cunoştinţele temeinice din punctul de vedere al pregătirii fizice, tehnice, tactice şi teoretice, antrenorul care doreşte să obţină performanţe înalte trebuie să posede şi cunoştinţe solide legate de pregătirea mentală a sportivilor. În acest sens, autorul vine în sprijinul antrenorilor cu un *ghid* care poate fi folosit cu succes nu numai de către aceştia, ci şi de către sportivi. Informaţiile oferite de această carte permit antrenorilor să-şi ajute elevii în dezvoltarea abilităţilor mintale necesare pentru obţinerea performanţei în sport, dar şi în viaţă.

În timp ce alte cărţi de specialitate ne arată *ce* ar trebui făcut pentru a creşte performanţa sportivilor, autorul oferă sfaturi şi tehnici pentru a şti concret *cum* să realizăm acest lucru.

Informaţiile sunt prezentate într-un limbaj accesibil fiind vizate abilităţi mintale cum ar fi: controlul emoţional, stabilirea scopurilor, motivaţia, controlul atenţional, imageria mintală şi multe altele pe care cititorul le va descoperi cu mare plăcere.

Comunicare în activităţile sportive
Leon Gomboş
Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, 2012
118 pagini

Se poate spune că în prezent comunicarea stă practic la baza oricărei activităţi umane. Activitatea sportivă este, prin puternica ei mediatizare, un câmp deosebit de propice pentru toate formele de manifestare ale comunicării. În spiritul acestei abordări, lucrarea de faţă încearcă o prezentare a ceea ce înseamnă comunicarea sportivă, comunicarea în şi prin sport.

Adresându-se specialiştilor din domeniul sportului (profesori, antrenori, manageri sportivi), studenţilor facultăţilor de educaţie fizică şi sport, jurnaliştilor sportivi, dar şi publicului larg, lucrarea se doreşte a fi un îndrumar în ceea ce înseamnă comunicarea sportivă şi o familiarizare cu formele de manifestare ale acesteia.

Odiseea Olimpică
Efim Josanu
Editura Arc, Chişinău, 2012
248 pagini

Istoria Jocurilor Olimpice începe, aşa cum spune mitul, de la cele şase sute de picioare măsurate de Herakles pe terenul primei competiţii. Perioada de înflorire a jocurilor a coincis cu Antichitatea greacă, timp în care s-au stabilit regulile şi tradiţiile competiţiilor panelenice.

Timpurile moderne au diversificat şi înmulţit uzanţele de altădată, neschimbate rămânând doar spiritul de loialitate sportivă şi respectul faţă de partenerii din arenă. În perioada de existenţă a Jocurilor Olimpice, în palestre şi pe pistele de întrecere s-au stabilit mereu alte recorduri, s-au acoperit de glorie alţi atleţi, care au reuşit să fie mai iuţi, mai puternici, mai rezistenţi decât cei de ieri, dar s-au petrecut şi o mulţime de lucruri curioase ce constituie inefabilul vieţii sportive.

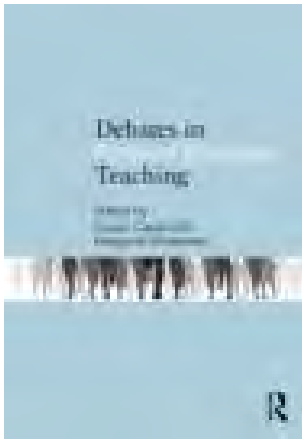
Despre acestea şi multe alte evenimente întâmplate în milenara istorie a Jocurilor Olimpice relatează acest volum. Scris cu multă competenţă, antrenant şi cu maxim folos pentru eventualul său cititor, textul cărţii constituie o lectură foarte plăcută pentru orice iubitor al sportului.

Leon Gomboş
leongombos@yahoo.com

Palestrica Mileniului III – Civilizaţie şi Sport
Vol. 13, no. 4, Octombrie-Decembrie 2012, 366–368

Book reviews
Recenzii cărţi

Debates in Physical Education Teaching
(Dezbateri în predarea educaţiei fizice)
Editori: Susan Capel, Margaret Whitehead
Editura: Routledge, Londra, august 2012
288 pagini; Preţ: £21.84



Apărută foarte recent (august 2012) în seria *Dezbateri privind predarea materiilor,* cartea asupra căreia ne oprim de data aceasta abordează problemele majore cu care profesorii de educaţie fizică se confruntă zilnic, în activitatea lor din şcoală, şi reţine chestiuni mai vechi, dar şi mai noi, aflate permanent în dezbatere. Ea promovează şi sprijină reflexia critică asupra respectivelor chestiuni, şi-şi propune să-i stimuleze pe toţi profesorii de specialitate – fie ei începători, sau mai experimentaţi – să formuleze judecăţi informate şi să-şi argumenteze punctele de vedere, bazaţi pe o înţelegere mai profundă a problemelor şi pe cunoştinţe teoretice cât mai actuale. Iar întrucât o lucrare ca aceasta nu putea „să nu se ocupe" şi de viitorul predictibil al domeniului, autorii şi editorii ne propun şi o perspectivă fundamentată asupra dezvoltării educaţiei fizice pe termen mediu şi lung, perspectivă rezultată din inventarierea şi asamblarea celor mai recente, documentate şi credibile abordări şi previziuni.

Pentru a justifica toate aprecierile de mai sus, este suficient să parcurgem o listă scurtă a temelor cheie dezbătute-dezvoltate pe parcursul celor aproape 300 de pagini ale cărţii, teme-întrebări ce se impun prin permanenta lor actualitate şi relevanţă: ♦ care sunt obiectivele educaţiei fizice?, ♦ ce trebuie să conţină curricula ei?, ♦ cum trebuie să judecăm succesul, reuşita în educaţia fizică? ♦ trebuie educaţia fizică să se adreseze cu adevărat tuturor indivizilor, sau doar celor cu plăcere şi talent pentru ea? ♦ poate într-adevăr educaţia fizică să contracareze creşterea incidenţei obezităţii? ♦ care este viitorul educaţiei fizice în secolul XXI?

Volumul, atât de necesar şi de binevenit acum, la începutul celui de-al doilea deceniu al secolului în care abia ce-am intrat, este rodul muncii, expertizei şi colaborării a 15 autori (incluzându-i aici şi pe cei doi editori – Susan Capel, professor la Universitatea Brunel din Londra şi Margaret Whitehead de la Universitatea din Bedfordshire); care, din păcate, aparţin cvasiexclusiv spaţiului geografic al insulelor britanice. Ceea ce, la rigoare, având în vedere şi tematica abordată, poate constitui o limită a cărţii, în sensul că se ridică întrebarea în ce măsură un astfel de colectiv de specialişti poate genera o viziune şi o perspectivă valabilă la nivel global, ştiut fiind că în tratarea unor astfel de aspecte, sunt inevitabile nuanţele şi particularităţile ce ţin de tradiţiile şi de cultura celor ce-şi exprimă concepţiile şi punctele de vedere.

Structural vorbind cartea este împărţită în 5 părţi, a câte 3 capitole, fiecare parte debutând cu o introducere. Partea I-a propriu-zisă (*Natura educaţiei fizice*) debutează cu un material redactat de către editori, material care, ţinând cont şi de titlul său – *Ce este educaţia fizică* ? – nu are cum să fie prea original, în zilele noastre definiţia şi conţinutul educaţiei fizice fiind văzute, cam peste tot în lume, în acelaşi mod. Urmează un capitol, al cărui titlu (*În ce constă educaţia, în educaţia fizică*), dar mai ales conţinutul, îşi propun pe de o parte să crească importanţa, rolul şi prestigiul disciplinei, iar pe de altă parte îi obligă foarte mult pe cei ce o profesează. Lucru asupra căruia ar trebui să se insiste mult mai mult şi în facultăţile de profil, ştiut fiind că din păcate, mai ales la noi, dar nu numai la noi, prea mulţi dintre profesori neglijează sau pur şi simplu ignoră rolul educativ pe care ar trebui să-l aibă orele lor, ori, atunci când totuşi îl au în vedere, nu deţin şi abilitatea de a acţiona în aşa fel încât aceste ore să genereze, efectiv şi durabil, în personalitatea şi comportamentul elevilor, toate efectele educative cu care este creditată educaţia fizică. *În ce constă instrucţia fizică (physical literacy) şi ce impact are ea asupra educaţiei fizice* este ceea ce îşi propune să dezbată şi să clarifice Margaret Whitehead, unul dintre editori, în capitolul al treilea. Iar dacă ne gândim că, în absolut, instrucţia fizică presupune dezvoltarea deprinderilor motorii de bază, dar şi a abilităţilor sportive fundamentale, în aşa fel încât copilul şi, ulterior, adultul şi vârstnicul, să se poată mişca şi comporta adecvat şi fără riscuri în toate cele patru condiţii ambientale posibile – pe pământ/podea, în apă, pe zăpadă/gheaţă şi în aer – şi că de achiziţionarea şi perfecţionarea acestui bogat şi complex bagaj motric nu trebuie şi nu poate să se ocupe doar educaţia fizică, rezultă că cele reţinute în paginile acestui capitol au o deosebită relevanţă şi că ele vor suscita un interes viu în rândul specialiştilor care le vor citi.

Cele trei capitole ale părţii secunde a cărţii (*Învăţarea în educaţie fizică*) duc dezbaterea mai departe, prima temă dezvoltată fiind *Ce trebuie să înveţe copii în orele de educaţie fizică?* Această întrebare-invitaţie la dezbatere nu este deloc superfluă, dacă ne gândim că, la fel ca şi în cazul altor „materii şcolare", există tendinţa şi riscul ca orele de educaţie fizică să-şi propună prea multe. Şi asta

în condiţiile în care – cercetările au demonstrat-o clar – „copii achiziţionează cel mai bine o deprindere atunci când au suficient timp la dispoziţie pentru a o exersa, şi când exersarea, antrenarea se realizează într-un context cât mai adecvat nivelului lor din acel moment". Este necesar aşadar ca, pentru fiecare copil, să fie realizate acele condiţii care să-i facă exersarea nici prea grea, dar nici prea uşoară; or, o asemenea individualizare nu este posibilă decât dacă programa nu este prea încărcată. *Educaţia fizică şi sănătatea* este titlul următorului capitol, iar în cadrul lui se face o bună trecere în revistă a rolului pe care şcoala în general, şi educaţia fizică în special, trebuie să-l aibă în promovarea pe termen lung a sănătăţii viitorilor membri ai societăţii. De altfel, în mod logic şi necesar, pe lângă alte criterii şi considerente, de îndeplinirea acestui rol ţine în principal şi „succesul în educaţia fizică", chestiune abordată în capitolul 6: *Ce este succesul în educaţia fizică şi cum poate fi el cel mai bine atins?*

De *Predarea în educaţia fizică* se ocupă ce-a de-a treia parte a cărţii, care debutează prin atacarea frontală a unei problematici de mare importanţă şi urgenţă – *Regândirea cunoştinţelor profesorului de educaţie fizică.* Problematică despre care, până ce va avea acces la cartea de care vorbim, specialistul român îşi poate face o idee, accesând gratuit acest foarte bun articol, apărut tot în august 2012: http://ro.ecu.edu.au/cgi/viewcontent.cgi?article=1772&context=ajte&sei-redir=1&referer=http%3A%2F%2Fwww.google.ro%2Furl%3Fsa%3Dt%26rct%3Dj%26q%3DRethinking%2Bteacher%2Bknowledge%2Bin%2Bphysical%2Beducation%26source%3Dweb%26cd%3D3%26ved%3D0CDUQFjAC%26url%3Dhttp%253A%252F%252Fro.ecu.edu.au%252Fcgi%252Fviewcontent.cgi%253Farticle%253D1772%2526context%253Dajte%26ei%3DuJzUOupCoaWswaH_IGYDA%26usg%3DAFQjCNGKLsrSma_E_YHOQ1szNFi9692vlg#search=%22Rethinking%20teacher%20knowledge%20physical%20education%22. *De ce profesorii de educaţie fizică adoptă o anumită modalitate de a preda?* este titlul capitolului ce urmează, după care, în capitolul 9, Dr. Paula Zwozdiak-Myers, care şi în teza de doctorat – ce poae fi găsită, în întregime, aici: http://bura.brunel.ac.uk/bitstream/2438/4316/1/PhD-Abstract,%20Contents,%20Tables%20and%20Figures-final_merged.pdf – s-a ocupat de practica reflexivă în predare şi de cele 9 dimensiuni ale sale, răspunde, elaborat şi exhaustiv, la întrebarea: *Sunt profesorii de educaţie fizică nişte practicieni reflexivi?*

Jucătorii cheie din educaţia fizică se intitulează partea a IV-a, iar despre cei mai importanţi dintre aceştia, cei cărora li se adresează şi beneficiază de educaţia fizică, citim în paginile capitolului 10: *Cui se adresează educaţia fizică?* Cum este şi normal, în capitolul imediat următor – *Cine trebuie să predea educaţia fizică în cadrul curriculei şi al timpului extra-curricular* – ni se vorbeşte despre ceilalţi „jucători cheie" implicaţi, pentru ca, în continuare, să fie abordată problema *Percepţiei publice a educaţiei fizice.* Percepţia publică fiind o chestiune de care specialiştii domeniului trebuie neapărat să se preocupe mai mult şi mai adecvat, să încerce să o îmbunătăţească şi, desigur, să ţină seamă. Aceasta deoarece activitatea fizică reprezintă o nevoie permanentă a tuturor indivizilor, fără excepţie, de care însă din ce în ce mai mulţi nu sunt atraşi, iar pe de altă parte deoarece, ca şi în cazul atitudinii faţă de religie, există o evidentă discordanţă între ceea ce părinţii şi elevii declară despre necesitatea şi utilitatea ei şi, respectiv, participarea şi implicarea copiilor în orele şi programele de educaţie fizică.

Volumul se încheie cu o *Privire către viitor*, în care se încearcă o proiecţie pe termen mediu şi lung a domeniului. În acest sens, mai întâi, în capitolul 13, prof. Kathleen Armour, de la Universitatea din Birmingham, argumentează de ce *Conceptualizarea predării şi a învăţării* ar reprezenta principala provocare căreia trebuie să-i facă faţă cei care-i formează pe viitorii profesori de educaţie fizică. După care, în penultimul capitol (*Care este viitorul educaţiei fizice în secolul XXI?*), prof. David Kirk, de la Universitatea Bedfordshire actualizează, dar şi restrânge, constrâns fiind de numărul de pagini avut la dispoziţie, interesantele idei şi perspective lansate într-o carte din 2010, intitulată chiar „Viitorul educaţiei fizice"; carte ce, din fericire, poate fi downladată gratis, în întregime, accesând site-ul http://202.125.156.86/ebooks/hpe/Physical%20Education%20Futures%20%20%20%202009%20by%20David%20Kirk.pdf.

Concluziile celor doi editori se constituie în substanţa ultimului capitol, al unei cărţi efectiv actuală şi incitantă, prin tematica abordată, şi realmente persuasivă, prin conţinut şi formă de exprimare.

Gheorghe Dumitru
gdumitru@seanet.ro

Sentimente la fileu. Ioan Bânda, un om, o pasiune
(Feelings near the volleyball net. Ioan Banda, a man, and his passion)
Editori: Cornel Udrea (coord.)
Editura: Napoca Star, Cluj-Napoca, 2012
65 pg, 16 fig. alb negru, 20 fig. color, un tabel.
Grafica C. Cheşuţ; fotografii I. Huta şi E.Moritz.

Volumul a fost editat cu ocazia comemorării a 10 ani de la decesul lui Ioan Bânda – sportiv multilateral: voleibalist, antrenor, manager. Cartea reuneşte 17 texte dedicate memoriei acestui remarcabil sportiv. Autorii sunt C. Udrea, I. Huţu, O. I. V. Vanea, C. Gaţu, A. Oşan, G.

Roman, D. Alexandru Sono, V. Chiorean, T. Ionescu, D. Prigoană, G. Mitroi, T. Tănase şi C. Cheşuţ. Sunt incluse şi două emisiuni radiofonice din 2003 şi 2004. Cu excepţia unui text, toate intervenţiile vizează anul 2003.

Fotografiile surprind personalitatea lui Bânda sau ipostaze cotidiene ale activităţii sale. Comemorarea lui Ioan Bânda s-a materializat prin organizarea memorialului Ioan Bânda organizat la 14-15 Septembrie a.c. la Cluj-Napoca, eveniment semnalat şi în presă de Demostene Şofron.

De menţionat faptul că la Cluj-Napoca există clubul sportiv Ioan Bânda. Am remarcat o singură lacună în această plachetă. Lipseşte un text care să prezinte întreaga viaţă a regretatului sportiv, prin care cititorul să primească informaţii mai complete asupra vieţii şi activităţii sale. De fapt nu aflăm nici anul său de naştere. În câteva texte apare greşit Bînda.

Petru Derevenco
stela.ramboiu@gmail.com

Journals' reviews
Recenzii reviste

Sport şi Societate
(Sport and Society)

Revista Palestrica Mileniului III a obţinut prin schimb câteva numere din revista Sport şi Societate – Serie nouă – (volumele 9-12) consacrată educaţiei fizice, sportului şi ştiinţelor conexe, editată de Facultatea de Educaţie Fizică şi Sport a Universităţii "Al. I. Cuza" din Iaşi.

Dispunem astfel de şapte numere: nr.1. 2009, nr.2. 2009, nr.1. 2010, nr.2. 2010, nr.1. 2011, nr.2. 2011 şi nr.1. 2012.

Revista apare bianual. Numărul de pagini este inegal, situat între 54 şi 145, astfel că şi numărul de articole publicate variază mult.

Tematica articolelor consacrate ştiinţelor efortului şi sportului este, de asemenea, foarte diversă. Spicuim câteva titluri.

- Identificarea talentului sportiv
- Antrenamentul prin interval
- Exerciţii fizice în osteoporoză
- Sindromul burnout
- Educaţia fizică şi sportul în Israel
- Importanţa personalităţii antrenorului
- Adaptarea la efort a sistemului circulator la rugbişti
- Corectarea deviaţiilor de coloană
- Model matematic pentru studiul biomecanicii genunchiului
- Comentarii la Campionatul European de Fotbal din Polonia şi Ucraina

Redacţia revistei propune potenţialilor colaboratori şi cititorilor următoarele rubrici:

- învăţământ primar, gimnazial, superior, special;
- învăţământ postuniversitar;
- sport şcolar şi universitar;
- sport de performanţă;
- sport pentru toţi;
- istorie, olimpism, organizare, management;
- kinetoterapie şi discipline medicale asociate educaţiei fizice şi sportului;
- cercetare studenţească.

Colaborarea este deschisă cadrelor didactice din învăţământul preuniversitar şi superior, antrenorilor şi specialiştilor din cluburile sportive, direcţiilor judeţene de profil şi studenţilor cu preocupări în domeniu. Între meritele revistei subliniez existenţa unor referenţi din străinătate şi faptul că toate articolele, începând cu rezumatul şi încheind cu concluziile, apar în paralel în limbile română şi engleză. La sfârşitul anului 2011 revista ieşeană era cotată B+, indicele Copernicus fiind de 4.07 puncte. Dintre lacunele observate semnalăm colectivul de redacţie prea restrâns, bibliografia, cu rare excepţii, prea sumară şi cu puţine surse preluate din străinătate. De altfel doar câteva articole sunt semnate de autori străini.

Adresa editorului principal Adrian Cojocaru: email codriano@unic.ro sau contact@sportsisocietate.ro, Tel. 0232-201026.

Petru Derevenco
stela.ramboiu@gmail.com

***

Continuarea schimbului revistei *pm3* cu *The American Journal of Sports Medicine* s-a concretizat prin îmbogăţirea colecţiei cu noi numere. În prezent revista *pm3* primeşte prin schimb exemplare din următoarele reviste: *The American Journal of Sports Medicine* (Thousand Oaks), *Sience et Sport* (Paris), *Deutsche Zeitschrift für Sportmedizin* (Ulm) *Sport şi Societate* (Iaşi), *Clujul Medical* (Cluj-Napoca), *Studia-Educatio Artis Gimnasticae* (Cluj-Napoca), care pot fi consultate la sediul revistei noastre.

Palestrica Mileniului III – Civilizaţie şi Sport
Vol. 13, no. 4, Octombrie-Decembrie 2012, 370

EVENTS
EVENIMENTE

Întâlnirea veteranilor atletismului clujean (18)
An encounter of old-timers from Cluj (18)

Evenimentul stabilit cu 18 ani în urmă, cel al întâlnirii anuale a foştilor atleţi ai Clubului „Universitatea", întâlnire devenită deja tradiţie, a reunit şi anul acesta un număr important de veterani.

La orele 10 ale dimineţii primei zile de sâmbătă, 1 septembrie, la mică distanţă de intrarea pe pista de atletism, locul unde tronează obeliscul ridicat în memoria Dr. Ioan Arnăut, s-au întâlnit ca de obicei, o parte a foştilor atleţi şi atlete, care au dus faima Clubului „U" de atletism.

În acest an au răspuns evenimentului atleţi din ţară, precum şi unii stabiliţi în străinătate. Din fotografiile prezentate în continuare se remarcă foştii atleţi viteziştii şi componenţi ai ştafetei 4x100 m Virgil Grobei şi soţia, Mircea Pop şi Ilarie Măgdaş, Dora Copândean-Dumitrescu, demifondista Marilis Cuţui, demifondistul Gheorghe Monea, săritoarea în înălţime Draga Comşa-Crişan, săritorii în lungime Vasile Sărucan şi Maria Marta, decatlonistul Vasile Bogdan - actualul Decan al Facultăţii de Educaţie Fizică a Universităţii „Babeş-Bolyai", alergătoarea de viteză 100-200 m Ana Beşuan, venită din Germania pentru eveniment, vitezistul Peter Szekernyes, alergătorii de garduri Andrei Deak şi Mariana Nedelcu, săritorul cu prăjina Traian Bocu, antrenorul Dumitru Olteanu, formatorul decatlonistului Vasile Bogdan.

Deschiderea evenimentului a fost făcută de preşedintele executiv al CS „Universitatea" Ovidiu Vasu, care a adresat participanţilor un tradiţional „bun venit".

De la stânga: Marilis Cuţui, Ovidiu Vasu, Vasile Bogdan, Gheorghe Monea, Szekernyes Peter.

De la stânga: Mariana Nedelcu, Maria Marta, Dora Copândean-Dumitrescu, Marilis Cuţui, Mircea Pop, Virgil Grobei şi soţia, Ilarie Măgdaş, Ana Beşuan, Ovidiu Vasu, Draga Comşa-Crişan, Vasile Sărucan, Andrei Deak, Gheorghe Monea, Dumitru Olteanu, Traian Bocu, Peter Szekernyes.

De la stânga: Ana Beşuan, Dora Copândean-Dumitrescu, Mircea Pop, Vasile Sărucan, Virgil Grobei.

Adunarea la locul de socializare.

Traian Bocu
traian_bocu@yahoo.com

ÎN ATENŢIA COLABORATORILOR

Tematica revistei

Ca tematică, revista are un caracter multidisciplinar orientat pe domeniile biomedical, sănătate, efort fizic, ştiinţe sociale, aplicate la activităţile de educaţie fizică şi sport, astfel încât subiectele tratate şi autorii aparţin mai multor specialităţi din aceste domenii. Principalele rubrici sunt: „Articole originale" şi „Articole de sinteză".

Exemplificăm rubrica „Articole de sinteză" prin temele importante expuse: stresul oxidativ în efortul fizic; antrenamentul mintal; psihoneuroendocrinologia efortului sportiv; cultura fizică în practica medicului de familie; sporturi extreme şi riscuri; determinanţi emoţionali ai performanţei; recuperarea pacienţilor cu suferinţe ale coloanei vertebrale; sindroame de stres şi psihosomatică; educaţia olimpică, aspecte juridice ale sportului; efortul fizic la vârstnici; tulburări ale psihomotricităţii; pregătirea sportivă la altitudine; fitness; biomecanica mişcărilor; testele EUROFIT şi alte metode de evaluare a efortului fizic; reacţii adverse ale eforturilor; endocrinologie sportivă; depresia la sportivi; dopajul clasic şi genetic; Jocurile Olimpice etc.

Dintre articolele consacrate studiilor şi cercetărilor experimentale notăm pe cele care vizează: metodica educaţiei fizice şi sportului; influenţa unor ioni asupra capacităţii de efort; profilul psihologic al studentului la educaţie fizică; metodica în gimnastica sportivă; selecţia sportivilor de performanţă.

Alte articole tratează teme particulare vizând diferite sporturi: înotul, gimnastica ritmică şi artistică, handbalul, voleiul, baschetul, atletismul, schiul, fotbalul, tenisul de masă şi câmp, luptele libere, sumo.

Autorii celor două rubrici de mai sus sunt medici, profesori şi educatori din învăţământul universitar şi preuniversitar, antrenori, cercetători ştiinţifici etc.

Alte rubrici ale revistei sunt: editorialul, actualităţile editoriale, recenziile unor cărţi - ultimele publicate în domeniu, la care se adaugă şi altele prezentate mai rar (invenţii şi inovaţii, universitaria, preuniversitaria, forum, remember, calendar competiţional, portrete, evenimente ştiinţifice).

Subliniem rubrica "Memoria ochiului fotografic", unde se prezintă fotografii, unele foarte rare, ale sportivilor din trecut şi prezent.

De menţionat articolele semnate de autori din Republica Moldova privind organizarea învăţământului sportiv, variabilitatea ritmului cardiac, etapele adaptării la efort, articole ale unor autori din Franţa, Portugalia, Canada.

Scopul principal al revistei îl constituie valorificarea rezultatelor activităţilor de cercetare precum şi informarea permanentă şi actuală a specialiştilor din domeniile amintite. Revista îşi asumă şi un rol important în îndeplinirea punctajelor necesare cadrelor didactice din învăţământul universitar şi preuniversitar precum şi medicilor din reţeaua medicală (prin recunoaşterea revistei de către Colegiul Medicilor din România), în avansarea didactică şi profesională.

Un alt merit al revistei este publicarea obligatorie a cuprinsului şi a câte unui rezumat în limba engleză, pentru toate articolele. Frecvent sunt publicate articole în extenso într-o limbă de circulaţie internaţională (engleză, franceză).

Revista este publicată trimestrial iar lucrările sunt acceptate pentru publicare în limba română şi engleză. Articolele vor fi redactate în format WORD (nu se acceptă articole în format PDF). Expedierea se face prin e-mail sau pe dischetă (sau CD-ROM) şi listate, prin poştă pe adresa redacţiei. Lucrările colaboratorilor rezidenţi în străinătate şi ale autorilor români trebuie expediate pe adresa redacţiei:

Revista «Palestrica Mileniului III»
Redactor şef: Prof. dr. Traian Bocu
Adresa de contact: palestrica@gmail.com sau traian_bocu@yahoo.com
Adresa poştală: Str. Clinicilor nr.1 cod 400006, Cluj-Napoca, România
Telefon:0264-598575
Website: www.pm3.ro

Obiective

Ne propunem ca revista să continue a fi o formă de valorificare a rezultatelor activităţii de cercetare a colaboratorilor săi, în special prin stimularea participării acestora la competiţii de proiecte. Menţionăm că articolele publicate în cadrul revistei sunt luate în considerare în procesul de promovare în cariera universitară (acreditare obţinută în urma consultării Consiliului Naţional de Atestare a Titlurilor şi Diplomelor Universitare).

Ne propunem de asemenea să încurajăm publicarea de studii şi cercetări, care să cuprindă elemente originale relevante mai ales de către tineri. Toate articolele vor trebui să aducă un minimum de contribuţie personală (teoretică sau practică), care să fie evidenţiată în cadrul articolului.

În perspectivă ne propunem îndeplinirea criteriilor care să permită promovarea revistei la niveluri superioare cu recunoaştere internaţională.

STRUCTURA ŞI TRIMITEREA ARTICOLELOR

Manuscrisul trebuie pregătit în acord cu prevederile Comitetului Internaţional al Editurilor Revistelor Medicale (http://www.icmjee.org).

Numărul cuvintelor pentru formatul electronic:

– 4000 cuvinte pentru articolele originale,
– 2000 de cuvinte pentru studiile de caz,
– 5000–6000 cuvinte pentru articolele de sinteză.

Format pagină: redactarea va fi realizată în format A4. Paginile listate ale articolului vor fi numerotate succesiv de la 1 până la pagina finală.

Font: Times New Roman, mărime 11 pt.; redactarea se va face pe pagina întreagă, cu diacritice, la două rânduri, respectând margini egale de 2 cm pe toate laturile.

Ilustraţiile:

Figurile (grafice, fotografii etc.) vor fi numerotate consecutiv în text, cu cifre arabe. Vor fi editate cu programul EXCEL sau SPSS, şi vor fi trimise ca fişiere separate: „figura 1.tif", „figura 2. jpg", iar la solicitarea redacţiei şi în original. Fiecare grafic va avea o legendă care se trece **sub** figura respectivă.

Tabelele vor fi numerotate consecutiv în text, cu cifre romane, şi vor fi trimise ca fişiere separate, însoţite de o legendă ce se plasează **deasupra** tabelului.

PREGĂTIREA ARTICOLELOR

1. Pagina de titlu: – cuprinde titlul articolului (maxim 45 caractere), numele autorilor urmat de prenume, locul de muncă, adresa postală a instituţiei, adresa poştală şi adresa e-mail a primului autor. Va fi urmat de titlul articolului în limba engleză.

2. Rezumatul: Pentru articolele experimentale este necesar un rezumat structurat (Premize-Background, Obiective-Aims, Metode-Methods, Rezultate-Results, Concluzii-Conclusions), în limba română, de maxim 250 cuvinte (20 de rânduri, font Times New Roman, font size 11), urmat de 3–5 cuvinte cheie (dacă este posibil din lista de termeni consacraţi). Toate articolele vor avea un rezumat în limba engleză. Nu se vor folosi prescurtări, note de subsol sau referinţe.

Premize şi obiective: descrierea importanţei studiului şi precizarea premizelor şi obiectivelor cercetării.

Metodele: includ următoarele aspecte ale studiului:

Descrierea categoriei de bază a studiului: de orientare sau aplicativ.

Localizarea şi perioada de desfăşurare a studiului. Colaboratorii vor prezenta descrierea şi mărimea loturilor, sexul (genul), vârsta şi alte variabile socio-demografice.

Metodele şi instrumentele de investigaţie folosite.

Rezultatele vor prezenta datele statistice descriptive şi inferenţiale obţinute (cu precizarea testelor statistice folosite): diferenţele dintre măsurătoarea iniţială şi cea finală, pentru parametri investigaţi, semnificaţia coeficienţilor de corelaţie. Este obligatorie precizarea nivelului de semnificaţie (valoarea ***p*** sau mărimea efectului ***d***) şi a testului statistic folosit etc.

Concluziile care au directă legătură cu studiul prezentat.

Articolele de orientare şi studiile de caz vor avea un rezumat nestructurat (fără a respecta structura articolelor experimentale) în limita a 150 cuvinte (maxim 12 rânduri, font Times New Roman, font size 11).

3. Textul

Articolele experimentale vor cuprinde următoarele capitole: Introducere, Ipoteză, Materiale şi Metode (inclusiv informaţiile etice şi statistice), Rezultate, Discutarea rezultatelor, Concluzii (şi propuneri). Celelalte tipuri de articole, cum ar fi articolele de orientare, studiile de caz, editorialele, nu au un format impus.

Răspunderea pentru corectitudinea materialelor publicate revine în întregime autorilor.

4. Bibliografia

Bibliografia va cuprinde:

Pentru articole din reviste sau alte periodice se va menţiona: numele tuturor autorilor şi iniţialele prenumelui, anul apariţiei, titlul articolului în limba originală, titlul revistei în prescurtare internaţională (caractere italice), numărul volumului, paginile

Articole: Pop M, Albu VR, Vişan D et al. Probleme de pedagogie în sport. Educaţia Fizică şi Sportul 2000; 25(4):2-8.

Cărţi: Drăgan I (coord.). Medicina sportivă aplicată. Ed. Editis, Bucureşti 1994, 372-375.

Capitole din cărţi: Hăulică I, Bălţatu O. Fiziologia senescenţei. În: Hăulică I. (sub red.) Fiziologia umană. Ed. Medicală, Bucureşti 1996, 931-947.

Începând cu revista 4/2010, fiecare articol va trebui să se bazeze pe un minimum de 15 şi un maximum de 100 referinţe bibliografice, în majoritate articole nu mai vechi de 10 ani. Sunt admise un număr limitat de cărţi şi articole de referinţă (1-3), cu o vechime mai mare de 10 ani. Un procent de 20% din referinţele bibliografice citate trebuie să menţioneze literatură străină studiată, cu respectarea criteriului actualităţii acesteia (nu mai vechi de 10 ani).

Procesul de recenzare (peer-review)

Într-o primă etapă toate materialele sunt revizuite riguros de cel puţin doi referenţi competenţi în domeniu respectiv (profesori universitari doctori şi doctori docenţi) pentru ca textele să corespundă ca fond şi formă de prezentare cerinţelor unei reviste serioase. După această etapă materialele sunt expediate referenţilor revistei, în funcţie de profilul materialelor. În urma observaţiilor primite din partea referenţilor, redacţia comunică observaţiile autorilor în vederea corectării acestora şi încadrării în cerinţele de publicare impuse de revistă. Acest proces (de la primirea articolului până la transmiterea

observaţiilor) durează aproximativ 4 săptămâni. Cu această ocazie se comunică autorului daca articolul a fost acceptat spre publicare sau nu. În situaţia acceptării, urmează perioada de corectare a articolului de către autor în vederea încadrării în criteriile de publicare.

Conflicte de interese

Se cere autorilor să menţioneze toate posibilele conflicte de interese incluzând relaţiile financiare şi de alte tipuri. Dacă sunteţi siguri că nu există nici un conflict de interese vă rugăm să menţionaţi acest lucru. Sursele de finanţare ar trebui să fie menţionate în lucrarea dumneavoastră.

Precizări

Precizările trebuie făcute doar în legătură cu persoanele din afara studiului, care au avut o contribuţie substanţială la studiul respectiv, cum ar fi anumite prelucrări statistice sau revizuirea textului în limba engleză. Autorii au responsabilitatea de a obţine permisiunea scrisă din partea persoanelor menţionate cu numele în cadrul acestui capitol, în caz că cititorii se referă la interpretarea rezultatelor şi concluziilor acestor persoane. De asemenea, la acest capitol se vor face precizări în cazul în care articolul valorifică rezultate parţiale din anumite proiecte sau dacă acesta se bazează pe teze de masterat sau doctorat susţinute de autor, alte precizări.

Criterii deontologice

Redacţia va răspunde în timp util autorilor privind acceptarea, neacceptarea sau necesitatea modificării textului şi îşi rezervă dreptul de a opera modificări care vizează forma lucrărilor.

Nu se acceptă lucrări care au mai fost tipărite sau trimise spre publicare la alte reviste. Autorii vor trimite redacţiei odată cu articolul propus spre publicare, într-un fişier word separat, o declaraţie scrisă în acest sens, cu angajamentul respectării normelor deontologice referitoare la citarea surselor pentru materialele folosite (referinţe bibliografice, figuri, tabele, chestionare).

Materialele trimise la redacţie nu se restituie autorilor, indiferent dacă sunt publicate sau nu.

ÎN ATENŢIA SPONSORILOR

Solicitările pentru spaţiile de reclamă, vor fi adresate redacţiei revistei "Palestrica Mileniului III", Str. Clinicilor nr. 1, cod 400006 Cluj-Napoca, România. Preţul unei pagini de reclamă full color A4 pentru anul 2012 va fi de 250 EURO pentru o apariţie şi 800 EURO pentru 4 apariţii. Costurile publicării unui Logo pe coperţile revistei, vor fi stabilite în funcţie de spaţiul ocupat. Plata se va face în contul Societăţii Medicale Române de Educaţie Fizică şi Sport, CIF 26198743. Banca Transilvania, sucursala Cluj Cod IBAN: RO32 BTRL 0130 1205 S623 12XX (LEI).

ÎN ATENŢIA ABONAŢILOR

Revista "Palestrica Mileniului III" este tipărită trimestrial, preţul unui abonament fiind pentru străinătate de 100 Euro pentru instituţii, şi 50 Euro individual. Pentru intern, preţul unui abonament instituţional este de 120 lei, al unui abonament individual de 100 lei. Menţionăm că taxele de difuzare poştală sunt incluse în costuri.

Plata abonamentelor se va face prin mandat poştal în contul Societăţii Medicale Române de Educaţie Fizică şi Sport, CIF 26198743. Banca Transilvania, sucursala Cluj Cod IBAN: RO32 BTRL 0130 1205 S623 12XX (LEI); RO07 BTRL 01304205 S623 12XX (EURO); RO56 BTRL 01302205 S623 12XX (USD). SWIFT: BTRLRO 22

Precizăm că începând cu anul 2010 a fost introdusă taxa de articol. Ca urmare, toţi autorii semnatari ai unui articol vor achita împreună suma de 150 Lei, în contul Societăţii Medicale Române de Educaţie Fizică şi Sport publicat mai sus.

Autorii care au abonament vor fi scutiţi de această taxă de articol.

Alte informaţii se pot obţine online de pe www.pm3.ro „Pentru autori" sau pe adresa de mail a redacţiei palestrica@gmail.com sau pe adresa poştală: Str. Clinicilor nr.1 cod 400006, Cluj-Napoca, România, Telefon:0264-598575.

INDEXAREA

Titlul revistei: Palestrica Mileniului III – Civilizaţie şi sport

pISSN: 1582-1943; eISSN: 2247-7322; ISSN-L: 1582-1943

Profil: revistă de studii şi cercetări interdisciplinare

Editor: Universitatea de Medicină şi Farmacie „Iuliu Haţieganu" din Cluj-Napoca şi Societatea Medicală Română de Educaţie Fizică şi Sport, în colaborare cu Inspectoratul Şcolar al Judeţului Cluj

Nivelul de atestare al revistei: revistă acreditată în categoria B+ de CNCS în perioadele 2007-2011 şi atestată CMR din anul 2003 şi în prezent

Revistă indexată în Bazele de Date Internaţionale (BDI): EBSCO, Academic Search Complete, USA şi Index Copernicus, Journals Master List, Polonia

Anul primei apariţii: 2000

Periodicitate: trimestrială

Cuprinsul, rezumatele şi instrucţiunile pentru autori se găsesc pe pagina de Internet: http://www.pm3.ro Accesul la cuprins şi rezumate (în format pdf) este gratuit.

FOR THE ATTENTION OF CONTRIBUTORS

The subject of the Journal

The journal has a multidisciplinary nature oriented toward biomedical, health, exercise, social sciences fields, applicable in activities of physical training and sport, so that the dealt subjects and the authors belong to several disciplines in these fields. The main rubrics are: "Original studies" and "Reviews".

Regarding "Reviews" the main subjects that are presented are: oxidative stress in physical effort; mental training; psychoneuroendocrinology of sport effort; physical culture in the practice of the family doctor; extreme sports and risks; emotional determinatives of performance; the recovery of patients with spinal column disorders; stress syndromes and psychosomatics; olympic education, legal aspects of sport; physical effort in the elderly; psychomotricity disorders; high altitude sportive training; fitness; biomechanics of movements; EUROFIT tests and other evaluation methods of physical effort; adverse reactions of physical effort; sport endocrinology; depression in sportsmen/women; classical and genetic drug usage; Olympic Games etc.

Among articles devoted to original studies and researches we are particularly interested in the following: the methodology in physical education and sport; influence of some ions on effort capacity; psychological profiles of students regarding physical education; methodology in sport gymnastics; the selection of performance sportsmen.

Other articles approach particular subjects regarding different sports: swimming, rhythmic and artistic gymnastics, handball, volleyball, basketball, athletics, ski, football, field and table tennis, wrestling, sumo.

The authors of the two rubrics are doctors, professors and educators, from universities and preuniversity education, trainers, scientific researchers etc.

Other rubrics of the journal are: the editorial, editorial news, reviews of the latest books in the field and others that are presented rarely (inventions and innovations, universitaria, preuniversitaria, forum, memories, competition calendar, portraits, scientific events).

We highlight the rubric "The memory of the photographic eye", where photos, some very rare, of sportsmen in the past and present are presented.

Articles signed by authors from the Republic of Moldova regarding the organization of sport education, variability of the cardiac rhythm, the stages of effort adaptability and articles by some authors from France, Portugal, Canada must also be mentioned.

The main objective of the journal is highlighting the results of research activities as well as the permanent and actual dissemination of information for specialists in the field. The journal assumes an important role regarding the achievement of necessary scores of the teaching staff in the university and preuniversity education as well as of doctors in the medical network (by recognizing the journal by the Romanian College of Physicians), regarding didactic and professional promotion.

Another merit of the journal is the obligatory publication of the table of contents and an English summary for all articles. Frequently articles are published in extenso in a language with international circulation (English, French).

The journal is published quarterly and the works are accepted for publication in the Romanian and English language. The journal is sent by e-mail or on a floppy disk (or CD-ROM) and printed, by mail at the address of the editorial staff. The works of contributors that are resident abroad and of Romanian authors must be mailed to the Editorial staff at the following address:

„Palestrica of the third millennium – Civilization and sport"
Chief Editor: Prof. dr. Traian Bocu
Contact address: palestrica@gmail.com or traian_bocu@yahoo.com
Mail address: Clinicilor street no. 1 postal code 400006, Cluj-Napoca, România
Telephone:0264-598575
Website: www.pm3.ro

Objectives

Our intention is that the journal continues to be a route to highlight the research results of its contributors, especially by stimulating their participation in project competitions. Articles that are published in this journal are considered as part of the process of promotion in one's university career (accreditation that is obtained after consultation with the National Council for Attestation of Universitary Titles and Diplomas).

We also intend to encourage the publication of studies and research, that include original relevant elements especially from young people. All articles must bring a minimum of personal contribution (theoretical or practical), that will be highlighted in the article.

In the future we propose to accomplish criteria that would allow the promotion of the journal to superior levels according international recognition.

THE STRUCTURE AND SUBMISSION OF ARTICLES

The manuscript must be prepared according to the stipulations of the International Committee of Medical Journal

Editors (http://www.icmjee.org).

The number of words for the electronic format:

– 4000 words for original articles;
– 2000 words for case studies;
– 5000-6000 words for review articles.

Format of the page: edited in WORD format, A4. Printed pages of the article will be numbered successively from 1 to the final page.

Font: Times New Roman, size 11 pt.; it should be edited on a full page, with diacritical marks, double spaced, respecting equal margins of 2 cm.

Illustrations:

The images (graphics, photos etc.) should be numbered consecutively in the text, with arabic numbers. They should be edited with EXCEL or SPSS programs, and sent as distinct files: „figure 1.tif", „figure 2. jpg", and at the editors demanding in original also. Every graphic should have a legend, written **under** the image.

The tables should be numbered consecutively in the text, with roman numbers, and sent as distinct files, accompanied by a legend that will be put **above** the table.

PREPARATION OF THE ARTICLES

1. Title page: – includes the title of article (maximum 45 characters), the name of authors followed by surname, work place, mail address of the institute and mail adress and e-mail address of the first author. It will follow the name of article in the English language.

2. Summary: For original articles a summary structured like this is necessary: (Premize-Background, Obiective-Aims, Metode-Methods, Resultate-Results, Concluzii-Conclusions), in the Romanian language, of maximum 250 words, followed by 3-8 key words (if its possible from the list of established terms). All articles will have a summary in the English language. Within the summary (abstract) abbreviations, footnotes or bibliographic references should not be used.

Premises and objectives. Description of the importance of the study and explanation of premises and research objectives.

Methods. Include the following aspects of the study:

Description of the basic category of the study: of orientation and applicative.

Localization and the period of study. Description and size of groups, sex (gender), age and other socio-demographic variables should be given.

Methods and instruments of investigation that are used.

Results. The descriptive and inferential statistical data (with specification of the used statistical tests): the differences between the initial and the final measurement, for the investigated parameters, the significance of correlation coefficients are necessary. The specification of the level of significance (the value ***p*** or the dimension of effect ***d***) and the type of the used statistical test etc are obligatory.

Conclusions. Conclusions that have a direct link with the presented study should be given.

Orientation articles and case studies should have an unstructured summary (without respecting the structure of experimental articles) to a limit of 150 words.

3. Text

Original articles should include the following chapters which will not be identical with the summary titles: Introduction (General considerations), Hypothesis, Materials and methods (including ethical and statistical informations), Results, Discussing results, Conclusions and suggestions. Other type of articles, as orientation articles, case studies, Editorials, do not have an obligatory format. Excessive abbreviations are not recommended. The first abbreviation in the text is represented first *in extenso*, having its abbreviation in parenthesis, and thereafter the short form should be used.

Authors must undertake the responsibility for the correctness of published materials.

4. Bibliography

The bibliography should include the following data:

For articles from journals or other periodical publications the international Vancouver Reference Style should be used: the name of all authors as initials and the surname, the year of publication, the title of the article in its original language, the title of the journal in its international abbreviation (italic characters), number of volume, pages.

Articles: Pop M, Albu VR, Vişan D et al. Probleme de pedagogie în sport. Educaţie Fizică şi Sport 2000; 25(4):2-8.

Books: Drăgan I (coord.). Medicina sportivă, Editura Medicală, 2002, Bucureşti, 2002, 272-275.

Chapters from books: Hăulică I, Bălţatu O. Fiziologia senescenţei. In: Hăulică I. (sub red.) Fiziologia umană, Ed. Medicală, Bucureşti, 1996, 931-947.

Starting with issue 4/2010, every article should include a minimum of 15 bibliographic references and a maximum of 100, mostly journals articles published in the last 10 years. Only a limited number of references (1-3) older than 10 years will be allowed. At least 20% of the cited resources should be from recent international literature (not older than 10 years).

Peer-review process

In the final stage all materials will be closely reviewed by at least two competent referees in the field (Professors,

and Docent doctors) so as to correspond in content and form with the requirements of an international journal. After this stage, the materials will be sent to the journal's referees, according to their profiles. After receiving the observations from the referees, the editorial staff shall inform the authors of necessary corrections and the publishing requirements of the journal. This process (from receiving the article to transmitting the observations) should last about 4 weeks. The author will be informed if the article was accepted for publication or not. If it is accepted, the period of correction by the author will follow in order to correspond to the publishing requirements.

Conflict of interest

The authors must mention all possible conflicts of interest including financial and other types. If you are sure that there is no conflict of interest we ask you to mention this. The financing sources should be mentioned in your work too.

Specifications

The specifications must be made only linked to the people outside the study but which have had a substantial contribution, such as some statistical processing or review of the text in the English language. The authors have the responsibility to obtain the written permission from the mentioned persons with the name written within the respective chapter, in case the readers refer to the interpretation of results and conclusions of these persons. Also it should be specified if the article uses some partial results from certain projects or if these are based on master or doctoral theses sustained by the author.

Ethical criteria

The Editors will notify authors in due time, whether their article is accepted or not or whether there is a need to modify texts. Also the Editors reserve the right to edit articles accordingly. Papers that have been printed or sent for publication to other journals will not be accepted. All authors should send a separate letter containing a written statement proposing the article for submission, pledging to observe the ethics of citation of sources used (bibliographic references, figures, tables, questionnaires).

Editorial submissions will be not returned to authors, whether published or not.

FOR THE ATTENTION OF THE SPONSORS

Requests for advertising space should be sent to the Editors of the "Palestrica of the Third Millennium" journal, 1, Clinicilor St., 400006, Cluj-Napoca, Romania. The price of an A4 full colour page of advertising for 2012 will be EUR 250 and EUR 800 for an advert in all 4 issues. The costs of publication of a logo on the cover will be determined according to its size. Payment should be made to the Romanian Medical Society of Physical Education and Sports, CIF 26198743. Banca Transilvania, Cluj branch, IBAN: RO32 BTRL 0130 1205 S623 12XX (RON).

SUBSCRIPTION COSTS

The "Palestrica of the Third Millennium" journal is printed quarterly. The subscription price is 100 EUR for institutions abroad and 50 EUR for individual subscribers outside Romania. For Romanian institutions, the subscription price is 120 RON, and for individual subscribers the price is 100 RON. Note that distribution fees are included in the postal costs.

Payment of subscriptions should be made by bank transfer to the Romanian Medical Society of Physical Education and Sports, CIF 26198743. Banca Transilvania, Cluj branch, IBAN: RO32 BTRL 0130 1205 S623 12XX (RON), RO07 BTRL 01,304,205 S623 12XX (EUR), RO56 BTRL 01,302,205 S623 12XX (USD). SWIFT: BTRLRO 22

Please note that in 2010 a tax for each article submitted was introduced. Consequently, all authors of articles will pay the sum of 150 RON to the Romanian Medical Society of Physical Education and Sport published above. Authors who have paid the subscription fee will be exempt from this tax. Other information can be obtained online at www.pm3.ro "Instructions for Authors", at our e-mail address palestrica@gmail.com or at the postal address: 1, Clinicilor St., 400006, Cluj-Napoca, Romania, phone: +40264-598575.

INDEXING

Title of the journal: Palestrica of the third millennium – Civilization and sport

pISSN: 1582-1943; eISSN: 2247-7322; ISSN-L: 1582-1943

Profile: a Journal of Study and interdisciplinary research

Editor: "Iuliu Haţieganu" University of Medicine and Pharmacy of Cluj-Napoca and The Romanian Medical Society of Physical Education and Sports in collaboration with the Cluj County School Inspectorate

The level and attestation of the journal: a journal rated B+ by CNCSIS in the period 2007-2011 and certified by CMR since 2003

Journal indexed into International Data Bases (IDB): EBSCO, Academic Search Complete, USA and Index Copernicus, Journals Master List, Poland

Year of first publication: 2000

Issue: quarterly

The table of contents, the summaries and the instructions for authors can be found on the internet page: http://www.pm3.ro. Access to the table of contents and summaries (in .pdf format) is free.

INDEX ALFABETIC AL AUTORILOR
care au publicat în anul 2012, în revista „Palestrica Mileniului III” – vol. 13, nr. 1; 2, 3; 4*

AUTHORS' ALPHABETICAL INDEX
who published during 2012, in "Palestrica of the Third Millennium" journal – vol. 13, nr. 1; 2, 3; 4*

* Interpretare: 13-2012/1:1 = Volumul - Anul apariţiei / Numărul revistei : Pagina

Editura Medicală Universitară „Iuliu Haţieganu” Cluj-Napoca

Tipărit la:

qual media

Producţie şi Simţire Publicitară

400117, Calea Dorobanţilor nr. 22, Cluj-Napoca, România
Tel.: 004 264 450 006, Fax: 004 264 591 672
E-mail: office@qualmedia.ro, www.qualmedia.ro

Editat cu sprijinul ANCS
Preţ de vânzare: 25 ron
Tiraj: 250 ex.